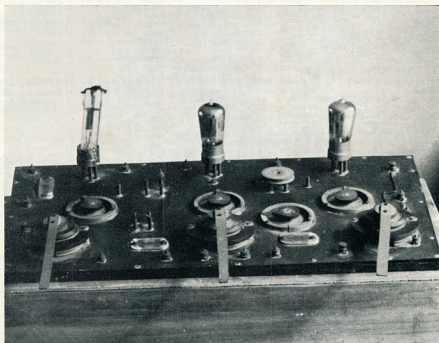


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★

OUR COVER

A modern DX receiver (vintage
1925) as used by Mr. Maxwell
Howden to win the Trans-Pacific
tests in May of that year, by logging
22 stations in the 150-250 metre band.
When transmitting licences became
available for that band, two-way
contact was made in the following
year by VK3BQ.

The handles in the front of the set
are coupled to the home-made tuning
condensers, ebonite being used to
eliminate hand capacity. In the centre
of the photo are the filament
rheostats, also hand wound, and the
coil can be seen in the centre top
right hand corner. Three B.T.H.
valves were used, and the one at the
left has been mounted in what
appears to be a glass test tube, sealed
to the base with paraffin wax. How
many Amateurs could today build
their own tuning condensers?

FEDERAL COMMENT

★

At the recent Federal Convention in Perth, an item was placed on the
agenda for consideration to be given to the purchase of land in Canberra by
the Institute as a site for a future Federal Headquarters. This item was
thoroughly discussed, and it was finally resolved that the Federal Executive
should investigate the whole matter and report to the Federal Council on the
possibility of such a venture.

This matter is naturally not one on which a hasty decision can be made
as there are many problems involved, not the least among these being the
question of finance, whether Canberra is the best place for a future Head-
quarters and many others. Perhaps the salient feature of this idea is whether
it is desirable or not from a member's point of view. The Federal Council
have thought so and have been forward-looking in this regard, and we feel
that every member will support this view in that in the not-too-distant future
a permanent home for the Institute Headquarters is necessary.

The saying—"Great oaks from little acorns grow"—is very apt in this
sense. From small beginnings and a realistic future plan, one can visualise a
similar growth to the presently strong A.R.R.L. organisation. And yet our
American contemporaries, despite their growth and strength, are even now
embarking on a further expansion in the accommodation for their League
Headquarters. Our future expansion may not be so clearly predictable as it is
with the A.R.R.L. because of our present organisation, but it is evident from
other items discussed at the recent Convention that there is a gradual trend
towards unification of the W.I.A. on a national basis. The two important items
on the agenda dealing with a new Constitution confirm this trend, and when
implemented may give a clearer indication of how we may attain our objective.

With the Institute's increasing growth in status of recent times, it is obvious
that more cognisance must be given to our Federal structure if we are to
survive and expand our activities. This scheme for finding a permanent home
for our Federal Headquarters is a step in the right direction, and although
the investigations are not likely to provide an early solution, we trust that
when the time for action does come every member of the Institute will whole-
heartedly support the Council in its final decision. As our planning of today
may become the reality of tomorrow, we hope to provide the Amateur
administrations of the future literally with a solid foundation on which to
build and expand.

FEDERAL EXECUTIVE, W.I.A.

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SPLATTER—ITS CAUSE AND PREVENTION

J. G. REED,* VK2JR

RECENT articles in "Amateur Radio" dealing with sideband splatter caused by over-modulation are to be commended. All too frequently we hear stations with radio whiskers the proverbial yard wide fouling many kilocycles of our ever-decreasing bands.

Unfortunately, these articles and the correspondence they have evoked have been noteworthy in major part for their misunderstanding of the basic reason for the generation of such splatter. What Amateurs look for in "Amateur Radio" are factual explanations and bread-and-butter information as to a cure, as most have a limited time to operate and meagre facilities to carry out real experimental work.

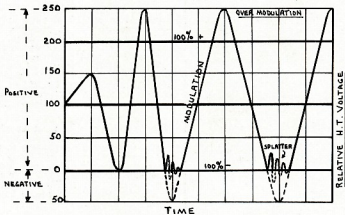
Generation of harmonics of the fundamental audio modulating frequencies plays a very minor part in the annoying signal spread caused by over-modulation. Unless subject to selective filtering in the speech amplifier, major energy level in radio telephone signals will be found well below 1,000 cycles per second, and harmonics of quite high order will be contained within a band scarcely distinguishable from the true information channel, and well within the normal selectivity curve of most receivers employed by Amateurs. The higher frequencies, which are responsible for most of the intelligibility of speech, have relatively low amplitude as compared to the former and the power level of their likely harmonics will be found correspondingly weak.

In this article, use will be made of such terms as modulator, modulated amplifier, and carrier wave, in the generally accepted meaning long associated with what is called amplitude modulation. Every single sideband, and those who have bothered to analyse seriously the art they have adopted as a plaything, know that the so-called amplitude modulated transmitter is really a generator of double sidebands, obligingly radiating an accurately centred heterodyne c.w. signal to help in resolving intelligible signals at the distant receiver. However, to simplify matters, let us assume that such a thing as amplitude modulation of a carrier really exists.

What we refer to as a modulator is really the final stage of an audio frequency amplifier, and the modulated amplifier a combination generator of high level r.f. power and most importantly, a high level mixer in which both r.f. and audio powers combine to generate the desired double sidebands. As the primary objective of this article is to explain what causes sideband splatter and show in a very practical manner how to go about curing this troublesome and illegal nuisance, let us have a look at the accompanying diagrams.

When the peak potential of the superimposed modulation equals that of the voltage of the h.t. d.c. supply to the modulated amplifier, we have what is referred to as 100% modulation, and

the average power of the so-called carrier and its sidebands as supplied to the radiator is 50% greater than that obtainable under c.w. conditions, or no modulation. If the modulator is capable of generating a greater peak potential than the h.t. supply, the peak appearing at the modulated amplifier on the positive half of the modulation cycle will be greater than double the unmodulated voltage, and conversely on the opposite swing, the anode of the modulated amplifier, momentarily, will be driven negative. As the cathode to anode path of the modulated amplifier depends on a varying flow of "one-way" electrons, there will be a sudden circuit interruption when the anode swings negative, and the load on the modulator correspondingly will be open circuited just as effectively as if a mechanical switch had interrupted the circuit. No longer will the modulation transformer have a relatively steady ohmic load into which to pump its alternating current output. This is shown graphically in Fig. 1.



Many who have attempted the measurement of resistance of a secondary winding of a high tension transformer using a simple low powered continuity tester will have experienced the mighty wallow given by the inductive kick of that winding when even a few milliamperes are suddenly interrupted. Something akin to this takes place when the output circuit of the modulator suddenly faces an open circuit no-load condition.

If the modulation transformer and associated parallel feed inductor formed a combination free of leakage inductance and distributed capacitance, interruption of external load would have any surge power dissipated through the anode paths of the modulator valves and distortion of audio wave shape would appear as a series of harmonics related to the frequency of the power

swing which caused the irregularity. This actually takes place, but is a minor contributor to splatter generation.

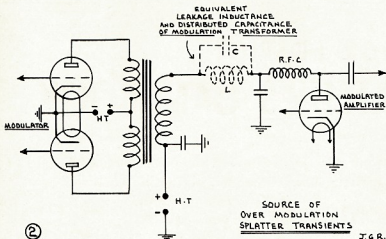
All of us who practise the unfortunately dying art of telegraphy, and if our transmitters are not protectively interlocked, have experienced the fireworks in the modulation transformer as we warm up to a "CQ" and have forgotten to short circuit the speech choke or modulation transformer secondary winding. The potentials generated by the shock excited windings may reach many thousands of volts with an almost certain chance of flashover and damage to this expensive piece of equipment.

Fig. 2 illustrates in simplified form the circuit connection of a modulator to the modulated amplifier. Leakage inductance and distributed capacitance of the modulation transformer windings are shown by the lumped values "L" and "C". Old timers who have used the buzzer method of exciting an absorption wavemeter to generate modulated radio signals will immediately realise that this "L/C" circuit will

oscillate at its natural frequency if shock excited. The better the quality of the modulation transformer, the lower will be the leakage inductance and distributed capacitance, and the higher will be the unloaded shock-excited oscillation frequency.

Immediately the modulator drives the anode of the modulated amplifier into its negative and non conductive region, this hidden oscillatory circuit gets to work. From actual measurement and calculation, it has been found that frequencies as high as 25,000 to 50,000 cycles per second are generated, and as these are superimposed on the instantaneous value of the fundamental signal frequency of the transformer, the previously "flat-bottomed" anode current curve will be filled with a multitude of small positive signal peaks reminiscent of the damped wave oscillations origi-

* 57 Kameruka Rd., Northbridge, N.S.W.



inating from an old time spark transmitter (as shown in Fig. 1). Depending on the relative energy content of this spurious "L/C" circuit and the amplitude of the fundamental over-modulation pulse, these splatter signals will persist, bearing no recognisable intelligible relationship other than a rhythmic association with the speech syllables of the speaker. Audio frequency harmonics of the fundamental speech frequencies have no causative association with what we hear as splatter.

What is needed is an automatic device which presents a load to the modulator during the negative over-modulation cycle. This will very effectively prevent the sudden interruption of alternating power through the windings of the modulation transformer, and shock excitation of the high audio frequency combination of leakage inductance and distributed capacitance will no longer take place.

The cause and cure of over-modulation splatter does not call for reams of pseudo-scientific obfuscation or specially designed heater transformers for surge protector diodes. There is available among the types of valves used in many television receivers a delightfully simple solution to the problem. This valve is the type 6R3 or its slightly

larger equivalent 6AL3, used to prevent "ringing" or self oscillation of circuits associated with picture tubes. The problem of heating the cathode, which must be at high potential to earth is solved by a built-in insulation of heater from cathode which will withstand a peak voltage of up to 6,000 volts, which is more than enough to handle the positive peaks of over-modulation applicable to transmitters with up to 2,000 volts of h.t. supply. These valves have their cathodes taken out through a top cap, with the anode and heater connections to a nine-pin base.

A resistance load approximately equal to that of the modulated amplifier should be connected in series with the cathode.

If the modulated amplifier is normally operating with a loading of 100 milliamperes at 1,000 volts, the resistor should have a value of 10,000 ohms, or approximately the equivalent of this value. There is nothing critical about this value and the nearest wire wound unit will do. Do not attempt to connect it between the anode and ground as base pin and socket insulation may not be able to withstand the high potentials experienced during modulation. As this resistor is not subject to a continuous load, and only comes automatically into

circuit during peaks of over-modulation, its duty cycle will be low and something about 20% in rating as compared with the modulated amplifier power input will be found more than ample to handle the most chronic form of over-modulation.

Herewith are relevant characteristics for both 6R3 and 6AL3 valves:—

	6R3	6AL3
Heater volts	6.3	6.3
Heater amperes	0.810	1.5
Dissipation (watts)	3.5	5
Peak anode current (mA.)	450	550
Aver. anode current (mA.)	150	2,200
Duty cycle (%)	22	22
Peak inverse volts	5,000	6,000
Cathode to heater positive volts	5,000	5,500

Pin connections: 1, 2 and 3—internal; 4 and 5—heater; 6, 7 and 8—internal; 9—anode; top cap—cathode.

Fig. 3 illustrates the schematic connections for this most useful valve which may be purchased for about the cost of a standard receiving valve at any t.v. or valve supply shop.

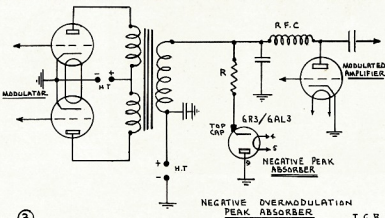
The famous Lord Kelvin once said: "When you can measure what you are speaking about and express it in numbers, you know something about it, and when you cannot measure it, when you cannot express it in numbers, your knowledge is of a meagre and unsatisfactory kind. It may be the beginning of knowledge, but you have scarcely in your thought advanced to the stage of a science."

I would sincerely recommend Amateur station operators—it would be a misuse of terms to call them experimenters—to do a very thorough digestion of Lord Kelvin's famous remarks before bursting almost hysterically into correspondence column print in condemnation of this very effective method of sideband splatter prevention.



OSCAR II. LAUNCHED

All Australian Amateurs are requested to forward their report forms to the Australian Co-ordinator. Contact your V.h.f. Group for full details and copies of the report form.



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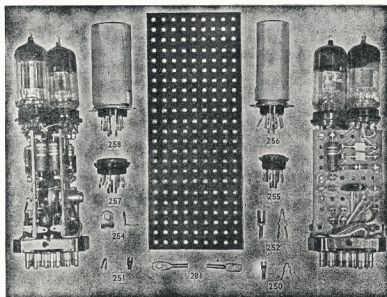
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MOBILE TRANSMITTER*

DESIGN FOR AMATEUR USE IN A CAR

C. J. SALVAGE, G3HRO

THE transmitter described here was designed to fit into the glove compartment of a Vauxhall "Cresta," but it is not necessary to buy a new car if you don't have this model as the transmitter shape may be modified to suit individual requirements, provided that the general layout is not substantially altered.

R.F. AND CONTROL UNIT

The v.f.o. (V1) uses a 6AK5, with coils switched to work on the 1.8, 3.5 and 7 Mc. bands. To help obtain good stability all capacitors in the oscillator circuit should be silver-mica types. The output of the oscillator (V1) is taken via C8 to the grid of a 6F17 valve (V2) which, on 1.8, 3.5 and 7 Mc., provides little gain because of its untuned resistive anode load (R7). On 14 and 21 Mc., however, L4 is tuned to 7 Mc. to provide sufficient output for doubling or tripling.

The next stage, another 6F17 (V3), has its anode circuit similarly switched, but this time L6, L7 and L8 are tuned to the respective v.f.o. frequencies of 1.8, 3.5 and 7 Mc. L9 is tuned to 14 Mc., causing V2 to double from 7 Mc., while L10 causes tripling to give 21 Mc. L11 (tuned to 28 Mc.) doubles from the previously-doubled 14 Mc. The resistor R11 across L6 is included to reduce

drive and increase bandwidth on the 1.8 Mc. range.

If drive is found to be excessive on either 3.5 or 7 Mc. it may be found advisable to include damping resistors across L7 or L8 also. The drive control (VR1) is a 50K ohm potentiometer and is mounted immediately below the 500 μ A. meter. Grid drive at 60w. input should correspond to a current of about 2.6 mA., but at reduced power on the 1.8 Mc. band it should be 1 mA. Grid current through R14 (22K ohms) should, at full power, develop 57v. drop. As R14 is returned to the -12v. line the total grid bias is about 69v. which is sufficient to operate V4 in Class C.

Transmit-receive switching is accomplished by S3 (a double-pole double-throw switch) mounted at the bottom centre of the front panel. Its action is to change over the aerial from receiver to transmitter and divert the -12v. supply either to the receiver or the relay in the power-supply unit for switching of the d.c. supplies to the transmitter.

The "net" switch (S4) is a small micro-switch behind the front panel, actuated by a push-button mounted between the drive control and the T-R switch. This micro-switch applies -12v. to the 250v. d.c. converter only, which results in the energisation of the v.f.o. and driver stages so that the v.f.o. can be tuned to zero beat with the received signal. When switch S3 is moved to "transmit" both 250v. and 600v. supplies are energised from the 12v. supply.

The chassis is constructed from 18 s.w.g. aluminium and the panel is made from 18 s.w.g. brass, chromium plated.

METER

The 500 μ A. meter can be switched to read:—

1. Battery potential "on load." This is very useful for indicating when re-charging is required if the equipment is used for long periods with the car stationary.

2. H.t. potential (600v. line).

3. Grid drive to V4, the power amplifier. R15 is a shunt, giving an f.s.d. of 3 mA.

4. Power-amplifier current, R16 (0.6 ohm) in the cathode circuit of V4, provides a shunt giving 150 mA. f.s.d. In this position the meter reads, of course, screen current as well as anode current, but this connection does prevent the application of high voltages to the meter and switch, as would occur if anode current alone were to be measured.

5. Aerial match. Switched to this position, the meter is used to give a measure of the radiated power of the station. In the plastics housing of one of the rear-lights is fitted a short "probe" aerial wire. The signal picked up by this is rectified by a diode, the d.c. path being completed by a r.f. choke and passed down a lead to the meter. The system is set up by adjusting the length of the probe (about 6 to 8 inches), once the aerial is correctly loaded, as shown by an r.f. ammeter

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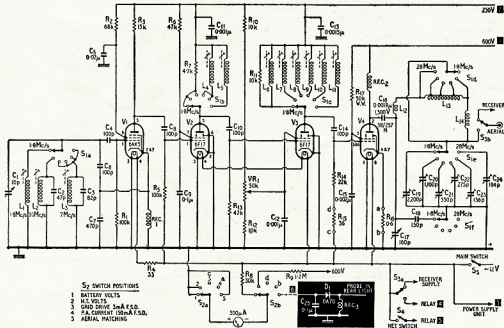


Fig. 1. Transmitter Circuit.

The Power supply enters through this unit for whole equipment. Small section in white-on-black is aerial-match monitor unit which is mounted in car rear-light housing.

(N.B.—Values of C24 and C23 are transposed on the diagram.)

temporarily connected in the coaxial lead. The adjustment is best made on the l.f. bands first.

MODULATOR

Fig. 2 shows the circuit of the modulator. As anode-and-screen modulation is extremely effective it was decided to use this method, making the modulator amplifier with transistors.

V6 and V7 are direct-coupled and have overall d.c. and a.c. negative feedback and the input stage (V5) is designed to match directly an electromagnetic microphone.

The output impedance of T2 has to match the anode circuit impedance of the p.a. (V4) which is 6K ohms. The output is taken from the collectors of the two OC28s (V9 and V10) and is thus stepped-up by the transformer. VR3 sets the no-signal current in the collector circuit of V8: 250 mA. is the level chosen for the OC16 used, but substitution of the newer OC28 may render a slight change desirable, both in no-signal collector current and emitter resistor.

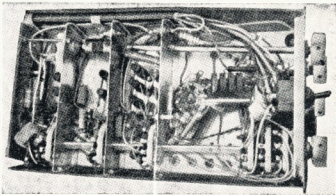
VR4 and VR5 are adjusted individually to set the quiescent collector currents of V9 and V10 to 30 mA. each. The photograph of the modulator shows V9 and V10 mounted on their heat sinks of blackened 16 s.w.g. aluminium.

The microphone is mounted on the steering column of the car and is of the balanced-armature variety (ex-Govt.). This was chosen as it matches the base impedance of V5 (about 300 ohms) and has high sensitivity. The modulator gives 25 to 30v. output in the audio frequency range required and is capable of modulating adequately the transmitter.

POWER SUPPLY UNIT

In the original article details were given of a commercial English transistor d.c./d.c. converter. Two of these units were used, one supplying 250 volts at 60 watts, and the other 600 volts at 60 watts. Readers are referred to "A.R." for October 1961 (page 3) wherein constructional details of transistor power supplies were given.

The three-core cable to the modulator can be seen in the photograph; two



V1 V2 V3 V4, Power Amplifier
Underside of Transmitter. At left (back of chassis) is v.f.o.; then are two amplifier-doublers and on right is power amplifier. Long extension spindle at the top of photograph is v.f.o. tuning capacitor, whilst band-switch extends along bottom of picture.

cores are connected to the secondary of the modulation transformer and the remaining one is used for the 12v. supply, which returns via the chassis. As it is desired to energise the modulator only when the p.a. is operating, this supply is taken from the relay contact that feeds the 600v. converter. Two contacts are, of course, necessary so that the 250v. supply alone can be switched on by the net button.

A small socket on the power supply accepts the lead carrying d.c. from the serial-match indicator mounted in the rear light, and the connections to a six-way socket are as follows:—

- 1—Modulated 600v. supply.
- 2—250v. supply.
- 3—Minus 12v. (after S5 in Fig. 1).
- 4—Relay supply from the transmit-receive switch (S3 in Fig. 1).
- 5—Supply to 250v. converter from net switch (S4 in Fig. 1).
- 6—D.c. from the serial-match indicator.

Both the power-supply unit and the modulator are mounted together under the back seat of the car.

AERIAL

The aerial is an ex-Government, 12 feet long, tapered tank aerial, in three four-foot sections, mounted on the car's back bumper. On 28 Mc. only the two lower sections are used, and on 21 Mc. the whip is used at its full length, as it is on the other bands. Loading coils are inserted on the bands below 21 Mc. to improve matching and are placed in the joint between the bottom and upper two sections.

Loading Coils.—Fig. 4 gives details of the loading coils and their construction and the photograph shows the four coils.

The top and bottom connections of the loading coils fit onto the whip sections, so either the relevant ends of unwanted sections may be used, or a little fitting is necessary.

The ferrite rods are 4" long by 1/2" diameter and are Mullard's type No. FX 1356/B2. Their ends are taped to avoid chatter and a rod is "nicked" with a file, broken, and ground to length for the two h.f. coils.

The synthetic-resin-bonded paper (Paxolin) tube that fits round the fer-

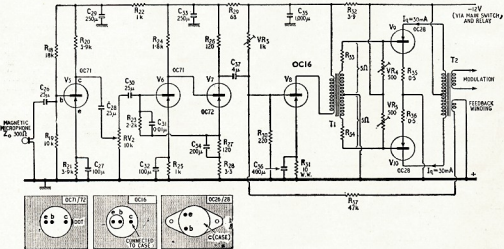


Fig. 2. Modulator Amplifier.

Old type of driver transistor (OC16) may be replaced by modern OC28. Supplies to modulator enter on three-core cable from power supply unit with which modulator is mounted. Microphone is wired separately back to steering column.

rite rod and provides the main mechanical strength is of 1" external diam. and is 6" long. The wall thickness is $\frac{1}{4}$ " and polystyrene inserts are arranged to fit between the tube and connections. A 4 B.A. screw passes through Paxolin and polystyrene into a brass insert fitted in the ends of the whip connections. The winding is mounted on six polystyrene ribs $\frac{1}{4}$ " long by $\frac{1}{8}$ " thick by $\frac{1}{2}$ " wide glued to the Paxolin tube.

1.8 Mc.: 69 turns of 18 s.w.g. enamelled wire, close spaced.

3.5 Mc.: Grooves are cut in the polystyrene ribs at a pitch of 10/in. and 34 turns of 18 s.w.g. enamelled wire are wound on at 10 turns/in. spacing.

7 Mc.: For this coil the Paxolin tube is only $\frac{1}{4}$ " long, the ferrite rod 2" and the ribs 2". The winding is 16 turns of 18 s.w.g. tinned-copper wire wound at 10 turns/in.

14 Mc.: Here the Paxolin tube is $\frac{3}{4}$ " long, the ferrite rod $\frac{1}{2}$ " and the ribs are $\frac{1}{2}$ " long and have their width reduced to 9/16". Six turns of 16 s.w.g. tinned-copper wire are wound at 10 turns/in.

To check resonance of the whip aerial the appropriate loading coil is inserted between the bottom and upper two sections of the whip. A small one or two-turn coil of about $\frac{1}{4}$ " diameter is temporarily connected between the bottom of the aerial and the chassis of the car. An accurate grid-dip oscillator is used against this coil and the loading coil is "pruned" to resonance at the l.f. end of the band. The temporary coil is now discarded and the 50-ohm coil from the aerial to the transmitter is fitted.

On the two l.f. bands it is necessary to make tapping points on the coils: these are found by loading the whip from the transmitter, starting at the l.f. end of the band and, as the frequency is increased, so the appropriate resonance positions are found on the coil by observing either a series ammeter or the aerial-match indicator. The established points on the coil can then be marked to correspond with the dial readings of the v.f.o. No tapping points are necessary on either the 7 or 14 Mc. coils.

Mounting.—As the Vauxhall's bumper is made in three parts it is possible to clamp the mounting plate between two of the bumper's sections; naturally other

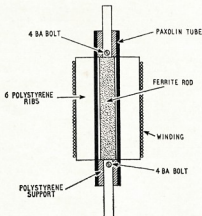
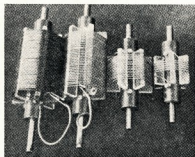


Fig. 4. Loading coil which fits between lower sections of whip. Details of dimensions, turns, etc., are given in associated text. Unit is supported by aerial rods, and connectors at top and bottom of unit must fit well into ends of aerial rods.



Four loading coils for whip aerial. 1.8 and 3.5 Mc. coils have tapping points made by flying lead and crocodile clip.

cars may necessitate slightly different arrangements.

The mounting is designed to have an impedance of 14 ohms, which is the value at the base of a correctly-loaded whip. It consists of an inner steel tube (the same material as the whip) about $\frac{1}{4}$ " long, fixed by adhesive to a polystyrene tube of $\frac{1}{2}$ " inside diameter and 0.6" outside diameter, the tube being $\frac{1}{2}$ " long. A piece of 20 s.w.g. alumin-

ium, $\frac{1}{16}$ " wide, is formed round this and is clamped between two of the bumper's sections. Adhesive is also applied to the outside of the polystyrene tube.

A small brass ferrule is soldered to the top of the steel tube and a brass insert fitted at the bottom is drilled and tapped for connection of the coaxial cable inner. Earthing bolts for the cable's braid are fitted through the bottom edge of the aluminium plate.

Effect of Whip Variations.—It will be found in practice that the 12 ft. whip can be varied in length if required. The bottom section may be reduced to 2 ft. without serious detuning on the l.f. bands, although the position of taps on the loading coil may vary slightly. This shorter length is often advisable in town or under trees but does reduce the radiated signal by a small amount. If, on the other hand, space permits, it is possible to increase the bottom section to 6 ft. and thereby increase its effectiveness. This obviously applies to the l.f. bands only; if the whip length is changed on the h.f. bands the alteration will significantly affect resonance.

The transmitter output and aerial are mismatched; but on the grounds of simplicity a matching transformer is not incorporated. It will be found that the preset capacitors C19 to C24 should be re-adjusted, after the aerial has been tuned to resonance, to give maximum aerial current as indicated by the match indicator or a r.f. ammeter in the feeder.

POWER CONSUMPTION

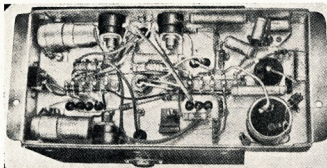
The transmitter and modulator together take a total of eight amperes at 12v. The current taken by the associated receiver is negligible but the transmitter heaters are, of course, left running when the installation is switched to "receive".

COMPONENTS SPECIFICATIONS

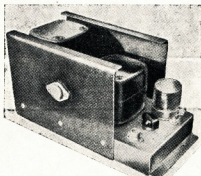
Resistors: $\frac{1}{4}$ w. 20% tolerance carbon types may be used in all positions except the following—

Transmitter—R16 (0.6 ohm). This is made up by winding wire on to a high value $\frac{1}{4}$ w. resistor. R17 (50K ohms) is a wire-wound type rated at 6w.

Modulator—R28 may be made up from two 6.8 ohm resistors in parallel. R32 (3.9 ohms) consists of a 6.8 ohm



Modulator—under-chassis view. VR2 (gain control) is available as a top-chassis control, but VR3, VR4 and VR5 (bias adjustments) are mounted on brackets under the chassis.



Top view of Modulator. Driver transistor, OC16 or OC20, is mounted between the transformers.

and an 8.2 ohm resistor in parallel. R33 and R34, see transformer section. R35 and R36 (0.5 ohm each) are made up by winding wire on to 1w. resistors of high value.

Transformers: Although these were made up there is no reason why suitable commercial alternatives (i.e. with characteristics not differing materially from those given here) should not be used.

Driver transformer, T1. This uses a "C" core, size 10/12/13, built up to a double loop. The turns ratio is 2:1 + 1, and the secondary is wound in the bifilar manner.

Primary inductance greater than 150 mH. at 250 mA. d.c., resistance less than 2 ohms. This winding consists of 200 turns of enamelled wire, 21 s.w.g.

Secondary resistance is 5 ohms each half, or is made up to this figure with R33 and R34, which may be made from a short length of resistance wire wound round a 1w. resistor. The winding is made up by taking two 32 s.w.g. enamelled wires and winding 100 turns of the pair of conductors.

Output transformer, T2. A larger "C" core, a double loop of size 10/24/13, is used for this. The turns ratio is 1 + 1:28. The primary inductance is greater than 25 mH. and the winding consists of 50 + 50 turns of 19 s.w.g. enamelled wire. The secondary has an inductance greater than 0.5 H. at 100 mA. d.c. and the winding is 1,400 turns of 36 s.w.g. enamelled wire. 50 turns of 36 s.w.g. wire form the feedback winding.

Suitable type cores are available from the local agents of English Electric and Telcon Magnetic cores.

Coils: L1 to L11 inclusive are wound on 0.3" diameter formers with grade 900 cores. (Aegis Manufacturing could supply a substitute coil former.) Coils on these formers are coated with polystyrene varnish to secure the turns.

L12, L13 and L14 form the pi output filter and are all in circuit for the 1.8 Mc. band, sections being progressively short-circuited for the higher-frequency bands. Tuning is accomplished by the trimmers C19 to C24; the fixed capacitor C18 and the p.a. tuning control C17.

Coil	Mc.	Details
L1, L6	1.8	About 80 μ H., wave-wound (pie 3/16" wide) with 40 s.w.g. d.s.c. to 1" diameter.
L2	3.5	76 turns, close wound, 38 s.w.g. enamelled.
L3	7.0	26 turns, close wound, 36 s.w.g. enamelled.
L4, L8	7.0	32 turns, close wound, 36 s.w.g. enamelled.
L5, L9	14.0	19 turns, close wound, 30 s.w.g. enamelled.
L7	3.5	80 turns, close wound, 38 s.w.g. enamelled.
L10	21.0	12 turns, close wound, 30 s.w.g. enamelled.
L11	28.0	8 turns, close wound, 30 s.w.g. enamelled.
L12	28.0	4 1/2 turns, 14 turns/in., 1" diam. air-spaced on polystyrene supports, 20 s.w.g. tinned copper. This coil is mounted near the top end of L13.
L13	21-3.5	23 turns, 14 turns/in., 1 1/2" diam. on ribbed former 2 1/2" long, 20 s.w.g. tinned copper. Mounted vertically, top-chassis. Tapping points at 2 1/2 turns from L12-L13 junction for 21 Mc., 5 1/2 turns for 14 Mc., 11 1/2 turns for 7 Mc.
L14	1.8	31 turns, close wound, 1" diam. Paxolin former, 20 s.w.g. enamelled. Mounted horizontally near L13 and L12.

Pi Output Filter: As will have been noted from the circuit diagram (Fig. 1) and the coil data, the output filter inductance is composed of sections of L12, L13 and L14 together, with preset tuning capacitors for each band and one variable capacitor. Approximate values of inductance and capacitance are given below for the various bands. The filter has an approximate impedance of 50 ohms.

Band Mc.	Capacitor (pF.)	Inductor (μ H.)
1.8	C17 = 310 C18 = 310 C19 = 2200	L12 = 28 L13 = 28 L14 = 28
3.5	C17 = 160 C20 = 1100	L12 = 14 L13 = 14
7.0	C17 = 80 C21 = 550	L12 = 7 L13 = 7
14.0	C17 = 40 C22 = 275	L12 = 3.5 L13 = 3.5
21.0	C17 = 26 C23 = 184	L12 = 2.3 L13 = 2.3
28.0	C17 = 20 C24 = 136	L12 = 1.7 L13 = 1.7

Switches: The room available for the band switch (S1) is considerably greater than on the receiver, also the switch has to handle high powers, especially in the output stage. It is thus a standard-size ceramic type with six single-pole six-position wafers. The meter switch (S2) must be of the break-before-make variety to avoid short-circuiting of the 12v. supply when changing function.

R.f. Chokes: Each choke is of 2.5 mH. inductance, wave-wound and split into pies. RFC2, the p.a. anode choke, is rated at 100 mA. d.c.

TECHNICAL ARTICLES

Readers are requested to submit articles for publication in "A.R." in particular constructional articles, photographs of stations and gear, together with articles suitable for beginners, are required.



Manuscripts should preferably be typewritten but if handwritten please double space the writing. Drawings will be done by "A.R." staff provided that the article is illustrated.



Photographs will be returned if the sender's name and address is shown on the back of each photograph submitted.



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Cer. No.	Call	Confirmations 144 Mc. 50 Mc.
1	VK2VO/T	100
2	VK3GG	114
3	VK3GV	185
4	VK2HE	102
5	VK2HE	318
6	VK7LZ	112
7	VK6BE	200
8	VK2HO	132
9	VK2ABR	143
10	VK3ZAX	100
11	VK4ZBE	100
12	VK3FW	157
13	VK4ZAZ	847

New Members:

14	VK3BQ	165
16	VK3V	118
17	VK4HD	104
17	VK3ADT	210
18	VK2BI	163
19	VK3NB	110
20	VK3ASZ	100
21	VK9XK	402

W.I.A. D.X.C.C.

Listed below are the highest twelve members in each section. New members and those whose totals have been amended will also be shown.

PHONE

Call	Cer. Cnt. No. ries	Call	Cer. Cnt. No. ries
VK3AB	45 295	VK6KW	4 206
VK6RU	2 263	VK3ATN	8 204
VK3AHO	51 253	VK4HR	12 192
VK6MK	43 252	VK4RW	23 184
VK3FH	11 230	VK3E	3 176
VK3WL	14 211	VK4WF	16 173

C.W.

Call	Cer. Cnt. No. ries	Call	Cer. Cnt. No. ries
VK3KB	10 300	VK3BZ	6 222
VK3CX	26 288	VK4HR	8 218
VK4FJ	29 269	VK3XU	48 213
VK3NC	19 255	VK7LZ	17 212
VK3FH	15 236	VK3V	39 211
VK6RU	18 224	VK3AGH	71 204

New Members:

VK3XB	75 191	VK3KS	74 134
VK3RJ	42 184	VK3JF	70 142
VK3AXK	30 140		

Amendments:

OPEN

Call	Cer. Cnt. No. ries	Call	Cer. Cnt. No. ries
VK2ACX	6 300	VK3AGH	83 253
VK6RU	8 278	VK3HJ	3 241
VK4FJ	32 275	VK4HR	7 233
VK3NC	77 260	VK3BZ	4 231
VK6MK	74 256	VK3JA	39 220
VK3AHO	76 256	VK3BL	45 225
Amendment:			
VK3TL	85 110		

A NOVEL METHOD OF BANDSPREADING

T. A. BRINKLEY,* VKISG

IN designing the tuning circuit of a receiver the most suitable variable condenser available is the starting point. Coils can be made to any exact practical value, and a fixed condenser in parallel with the tuner gives some control of coverage, and therefore bandspread.

Once the tuning range is decided on there is, for a variable condenser of given maximum and minimum capacity, only one value of inductance, and one value of fixed capacity, which can be employed if the chosen range is to fit exactly within the limits of the condenser.

These values can be easily computed, thereby saving lengthy fiddling with the inductance and fixed capacity—a process which is not only time consuming but is often concluded in exasperation, with unwanted coverage still remaining at one or both ends, and consequent loss of bandspread.

Both maximum and minimum values of the variable condenser must be known, and the writer commends that they should be measured before starting, since he bought from one well known shop a new condenser forty per cent. in excess of its advertised value.

The method is easiest explained by an example, using the case of an 80 metre receiver having coverage to allow the use of separate converters.

The tuning condenser available had a minimum capacity of 10 pF. and 60 pF. maximum. Coverage was chosen to be from 3.5 Mc. to 3.90 Mc.

From the formula $LC = 25330 \div f^2$

where L is inductance in μH .

C is capacity in pF.

f is frequency in Mc.

$$LC = 2128 \text{ for } 3.45 \text{ Mc.}$$

$$LC = 1665 \text{ for } 3.90 \text{ Mc.}$$

and C is the total circuit capacity comprising the tuning condenser (C1), the fixed condenser (C2 plus C3) and strays (C4).

At the 3.45 Mc. end of the range, 60 pF. is supplied by the tuning condenser and the remainder, as yet unknown, is supplied by the fixed condenser and strays.

If the total unknown capacity is denoted by x, we then have the capacity $x + 60$ pF. for 3.45 Mc., and $x + 10$ pF. for 3.90 Mc. There are now two equations:

$$L(x + 60) = 2128 \dots (1)$$

$$L(x + 10) = 1665 \dots (2)$$

Subtract equation (2) from equation (1) to get rid of one of the unknown x, then

$$L(x + 60) - L(x + 10) = 2128 - 1665$$

$$\text{or } Lx + 60L - Lx - 10L = 463$$

$$\text{hence } 50L = 463$$

$$L = 9.26 \mu H.$$

The total fixed capacitance, x, is now found by substituting 9.26 for L in

one of the original equations. Take equation (1):

$$\text{then } L(x + 60) = 2128$$

$$\text{or } Lx + 60L = 2128$$

$$\text{or } 9.26x + (60 \times 9.26) = 2128$$

$$\text{or } 9.26x = 2128 - 555.6$$

$$\text{hence } x = 1572.4 \div 9.26$$

$$= 170 \text{ pF.}$$

The only way to share this 170 pF. between fixed capacity and strays is to assume about 40 pF. for strays and use a mica condenser of about 140 pF. and an air trimmer in parallel with it.

When the circuit is wired it is only necessary to turn the tuning condenser to one of its limits, set a reliable oscillator to 3.45 or 3.90 Mc., as appropriate, and vary the trimmer until resonance is seen on the v.t.v.m. If the mica condenser is too high or too low to allow the value of fixed plus stray capacity = 170 pF. to be passed through, there will, of course, be no resonance.

The above paragraph assumes the coil is of the correct inductance. When an iron cored coil is used, but not set to the calculated inductance, successive adjustments of both coil and trimmer at each tuning limit must be made until the right coverage is achieved.

Air-cored coils, calculated from the same formula published in the "A.R." Data Sheet (May 1962) turned out close enough to require no adjustment, and iron-cored coils used later took about half an hour to line up.

It might be worth mentioning to those who have let their algebra develop parasites that you can't just decide against having fixed capacity and invent equations to suit your requirements; thus, substituting the condenser limits for C, we get

$$60L = 2128 \text{ for } 3.45 \text{ Mc.}$$

$$\text{and } 10L = 1665 \text{ for } 3.90 \text{ Mc.,}$$

then by subtracting the two equations, we find

L still comes out at 9.26 μH ., but it should be noted

$$\text{that } 60 \times 9.26 = 555, \text{ and not } 2128!$$

$$\text{and } 10 \times 9.26 = 92.6, \text{ and not } 1665!$$

The variable condenser should be of low value since this enables the highest possible ratio of L/C, a condition which leads to better performance, due to the higher dynamic circuit resistance. ●

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★

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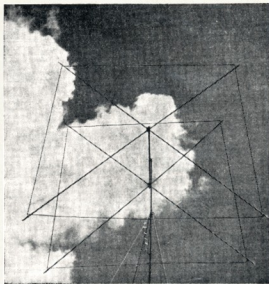
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A LOW COST S.B. TRANSMITTER

R. B. BENSLEY,* VK2XP

ONE of the difficulties in building a piece of equipment is how to convert the circuit diagram into an operating instrument. Obviously the first thing to do is to obtain a suitable circuit. However, if you analyse any circuit you will find that basically they all comprise a standard set of "building blocks," rarely does a new circuit present itself.

So I have come to the conclusion that providing correct wiring practices are followed, the essential point in building a circuit is the layout, or positioning of the individual parts. Of course if one is able to procure special components, then the layout can be simplified, but generally Amateurs use standard components. The use of disposals gear has made available to Amateurs parts that normally would not be available, at least not at such attractive prices.

The transmitter described uses parts which should be available, possibly from your "junk" box. (Wonder why the junk box never seems to have the part used in the article you are following?) The description will detail construction practice, rather than describe circuit functions.

The basis is the chassis. Mine was made of 16 gauge steel by a sheet metal shop, who also drilled all holes in this 18" x 10" x 3/4" piece of metal.

All circuits are kept physically separate, so minimising the possibility of interaction between units. The crystal oscillator and the v.f.o. were built on separate chassis, that for the v.f.o. being obtained from the transmitter section of an I.F.F. set. The v.f.o. is mounted on the top-right front hand side of the main chassis assembly. It was constructed from various disposal items; the oscillator coil (ceramic) coming from an AT5 oscillator unit, and the dial from a T75 tuning box. The EF50 valve is mounted on its side projecting from the v.f.o. chassis, inside of which is mounted all tuning gear.

A small sub-chassis, 4 1/2" x 2 1/2" houses the crystal oscillator, the crystal for which came from an old Command

transmitter. (Ham Radio, Hawthorn, may have supplies.) The output coil was made from an i.f. slug tuned transformer, which was cut down to size.

The carrier balance pots were mounted on the back of the main chassis. The balanced modulator stage was wired as the circuit diagram, with particular care being taken to ensure that all components were mounted

This system appeared to give better efficiency than any other yet tried.

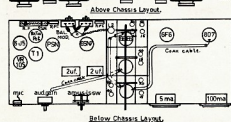
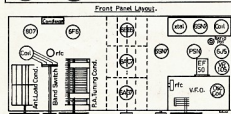
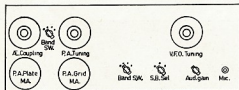
Audio is quite straight forward, but I used my a.m. pre-amplifier to feed into the 6J5. The driver transformer was one taken from a Command receiver. Across the centre of the main chassis is located the three-section Oak switch (mine was taken from a radar receiver). After all valve sockets have been wired, the various coils are fitted and set to the correct frequency using a g.d.o.

Check over all wiring to ensure that no errors have been made. Power can then be applied to the circuit and the station receiver used to set the rig on correct operating conditions. Listen to the transmitter signal and adjust the carrier balance pots until the carrier is reduced to its lowest attainable level. Set all coils exactly to frequency. A useful device is a low range microammeter and a diode, the unit connected as an absorption wavemeter. With the switch in the a.m. position you should be able to light a soup loop (a 150 mA. pea lamp with a small coil soldered across it) from the 6AG7 output coil.

A c.r.o. is not required to align the audio, even though it is very useful. (I suggest that you read the article in Jan. 1960 "A.R." by VK2EL.) Plug in some audio and adjust the ratio control until it is correctly set. Having done this, you can connect an aerial to the 6AG7 and you will be on s.b. with a reasonable signal. "Trial and error, and on-the-air reports," will tell you which switch position provides you with upper or lower sideband.

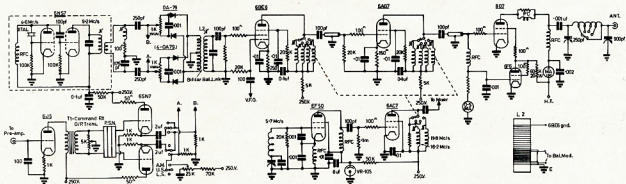
The final p.a. is an 807 with a 6F6 clamp tube. This is, to my mind, a simple way of doing things, as it does not require any regulated screen or bias power supplies.

(Continued on Page 15)



symmetrically. There is one thing which I did which I have not seen in any other circuit, namely the link coupling of the output coil from the balanced modulator. A bifilar wound coil with four turns each side being used. The grid coil side was resonant at 9.2 Mc. with a few pF. across it.

* "Girraheewen," Dalton, N.S.W.



REMEMBRANCE DAY CONTEST, 1962

A handsome perpetual trophy is awarded annually for competition between States, inscribed with the names of those who made the supreme sacrifice, and so perpetuating their memory throughout Amateur Radio in Australia.

The name of the winning Division each year is also inscribed on the trophy. In addition, the winning Division will receive a suitably inscribed framed photograph of the trophy.

Objects

Amateurs in each Call Area (this includes those in Australian Mandated Territories and Australian Antarctica) will endeavour to contact Amateurs in all other Call Areas (VK1 and VK2 are to be considered to be in the one Call Area; likewise VK5 and VK8).

Date of Contest

Saturday, 18th August, and Sunday, 19th August, 1962.

Duration

From 1800 hours E.A.S.T., 18th August, to 1759 hours E.A.S.T., 19th August, 1962. A period of 15 minutes' silence will be observed by all stations on 18th August, immediately prior to the beginning of the Contest, when an appropriate broadcast will be made by the VK6 Division and relayed from the Divisional Stations.

RULES

1. There shall be four sections to the Contest:—

- (a) Transmitting Phone.
- (b) Transmitting C.w.
- (c) Transmitting Open.
- (d) Receiving Open.

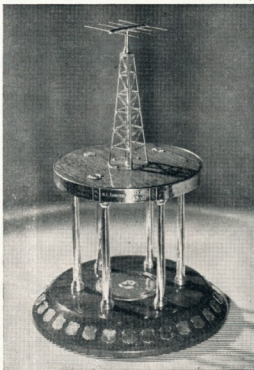
2. All Australian Amateurs may enter the Contest whether their Stations are fixed, portable or mobile, but only members of the W.I.A. are eligible for the awards.

3. All Amateur frequency bands may be used, but no cross-band operations are permitted.

4. Amateurs may operate on both phone and c.w. during the Contest (e.g. phone to phone, c.w. to c.w., or phone to c.w. and vice versa), but may submit an entry for one only of the above Sections listed in Rule 1.

An Open log will be one in which points are claimed for both phone and c.w. transmissions.

● The Federal Contest Committee of the Wireless Institute of Australia wishes all Australian Amateurs and Short Wave Listeners to participate in the Annual Contest which is held to perpetuate the memory of those Australian Amateurs who gave their lives for their country during World War II. It is held on the week-end nearest to 15th August, the date on which hostilities ceased in the South West Pacific Area.



Remembrance Day Contest Trophy.

A contestant transmitting on phone, but receiving on c.w. must enter for the phone section (and vice versa). Refer to Rule 11 concerning entry in logs.

5. Only one contact per station per band is allowed and arranged schedules for contacts on other bands is not permitted.

6. Only one licensed Amateur is permitted to operate any one station under the owner's call sign. Should two or more operate any particular station, each will be considered a contestant and must submit a separate log under his own call sign.

Contestants operating Club Stations other than their own shall be referred to, for the purpose of these Rules, as "substitute operators". Their operating procedure shall be as follows:

Phone contacts: Substitute operators will call "CQ Remembrance Day" followed by the call sign of the station they are operating and the word "log" followed by their own call sign.

C.w. contacts: Substitute operators will call "CQ RD de" followed by the group call sign comprising the call sign of the station they are operating, an oblique stroke, and their own call sign.

Contestants receiving signals from a substitute operator will qualify for points by recording the call sign of the substitute operator only.

7. Entrants must operate within the terms of their licences.

8. Cyphers.—Before points may be claimed for a contact, serial numbers must be exchanged and acknowledged. The serial number of five or six figures will be made up of the RS (telephony) or RST (c.w.) reports plus three figures starting from 001 for the first contact and which will increase in value by one for each successive contact. If any contestant reaches 999, he will start again with 001.

9. Entries must be set out as shown in the example, using **only one side** of the paper, and wherever possible standard W.I.A. log sheets should be used. Entries must be postmarked not later than 17th September, 1962, and addressed to the Federal Contest Committee, W.I.A., Box 6363, Brisbane, Qld.

10. Scoring will be based on the table shown:

SCORING TABLE

		To									
		VK0	VK1-2	VK3	VK4	VK5-8	VK6	VK7	VK9		
From	VK0	—	6	6	6	6	6	6	6		
	VK1-2	6	—	1	2	3	5	4	6		
	VK3	6	1	—	3	2	5	4	6		
	VK4	6	1	2	—	3	6	5	4		
	VK5-8	6	2	1	3	—	5	4	6		
	VK6	6	1	2	4	3	—	5	6		
	VK7	6	2	1	4	3	5	—	6		
	VK9	6	1	2	3	4	5	6	—		

Note.—Read table from left to right for points for the various call areas.

EXAMPLE OF TRANSMITTING LOG

Date/Time E.A.S.T.	Band	Emission	Call Sign	RST Nr. Sent	RST Nr. Revd.	V.h.f. Bonus	Points Claim.	—
Aug. '62								
18 1803	7 Mc.	A3	VK5XU	59001	—	—	2	—
18 2349	"	"	VK8RU	56005	—	—	5	—
19 1200	50 "	"	VK2OP	43026	—	—	25	1

Note.—Standard W.I.A. Log Sheets may be used to follow above form.

EXAMPLE OF RECEIVING LOG (VICTORIAN S.W.L.)

Date/Time E.A.S.T.	Band	Emission	Call Sign Heard	RST Nr. Sent	RST Nr. Revd.	Station Called	V.h.f. Bonus	Points Claim.	—
Aug. '62									
18 1803	7 Mc.	A3	VK5XU	59001	—	VK3XU	—	2	—
18 2349	"	"	VK8RU	56005	—	VK4YZ	—	5	—
19 1200	50 "	"	VK2OP	43026	—	VK9FA	25	1	—

Note.—Standard W.I.A. Log Sheets may be used to follow the above form.

In addition a bonus of 25 points may be claimed for the first contact in each call area on 50 Mc. or above.

11. All logs shall be set out as in the example shown and in addition will carry a front sheet showing the following information:

Name.....Section.....
Address.....Call Sign.....
Claimed Score.....

Declaration: I hereby certify that I have operated in accordance with the rules and spirit of the Contest.

Signed.....
Date.....

All contacts made during the Contest must be shown in the log submitted (see Rule 4).

Entrants in the Open Section must show phone and c.w. contacts in numerical sequence.

12. The right to disqualify any entrant who, during the Contest, has not observed the regulations or who has consistently departed from the accepted code of operating ethics.

13. The ruling of the Federal Contest Committee of the W.I.A. will be final. No disputes will be entered into.

14. Certificates will be awarded to the winners of the phone, c.w., open and receiving sections in each call area

(Northern Territory will count as a separate call area). There will be no outright winner for Australia. Further Certificates may be awarded at the discretion of the Federal Contest Committee.

The State to which the Perpetual Trophy will be awarded shall be determined in the following way.

To the average of the top six logs shall be added a bonus arrived at by adding to this average the ratio of logs entered to the State Licensees multiplied by the total points from all entries.

Example:

Average of the top six logs +
$$\left(\frac{\text{Logs Entered}}{\text{State Licensees}} \times \frac{\text{Total of Points}}{\text{from all Entrants}} \right)$$

Acceptable logs shall show at least five valid contacts.

The Trophy shall be forwarded to the winning State in its container and will be held by that State for a period of twelve months.

Note.—The F.C.C. emphasises the need for strict observance of Rule 9 in the Transmitting Section and Rule 3 in the Receiving Section.

RECEIVING SECTION

1. The Receiving Section is open to all Short Wave Listeners in Australia, but no transmitting station may enter.

2. Contest times and loggings of stations on each band are as for transmitting.

3. All logs shall be set out as shown in the example. Logs must show first the call sign of the station calling (not the station being called), the serial number sent by it and then the call sign of the station being worked. The scoring table to be used is the same as that used for transmitting and points must be claimed on the basis of the State in which the receiving station is located. A sample is given to clarify the position.

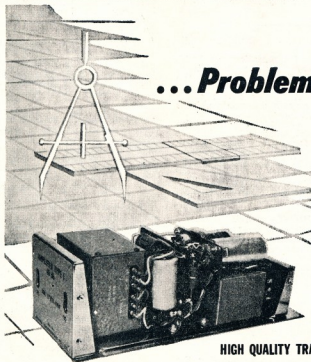
It is not sufficient to log a station calling CQ, nor is it permissible to log a station in the same call area as the receiving station.

For purposes of the Contest, VK1 and VK2 are considered to be the same call area, likewise VK5 and VK8.

4. A station heard may be logged once on phone and once on c.w. for each band.

5. Club receiving stations may enter for the Receiving Section of the Contest, but will not be eligible for the single operator award. However, if sufficient entries are received a special award may be given to the top receiving club station. All operators must sign the Declaration.

6. Awards. — Certificates will be awarded to the highest scorer in each call area. Further certificates may be awarded at the discretion of the Federal Contest Committee.



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XTAL CALIBRATOR CIRCUITS USING TRANSISTORS

R. G. ROPER,* VK5PU

THE circuit of Fig. 1 is included mainly for interest only; an extremely high degree of stability can be achieved if the crystal is ground to frequency and the padder C removed from the circuit. Stability with C included for trimming to frequency is still quite high, but not all 100 kc. crystals can be thus trimmed without dropping out of oscillation.

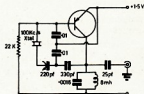


Fig. 1.

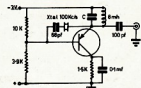


Fig. 2.

Fig. 2 is a good general purpose oscillator circuit, with some interesting features. By varying C, fundamental, 3rd overtone or half fundamental operation is possible. With a 100 kc. crystal, and an OC71, fundamental operation only is possible. However, with an OC45, a 100 kc. crystal oscillates at—

- (1) 300 kc.—a few kc. (third overtone). C = 208 pF.
- (2) 100 kc. (fundamental). C = 880 pF.
- (3) 50 Kc. C = 1,570 pF.

The division by two is exact, and 50 kc. checkpoints, crystal locked, with high harmonic content, are available.

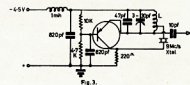


Fig. 3.

For those interested in transistorised converters for home or mobile, the overtone oscillator of Fig. 3 is included. Circuit constants shown are for 27 Mc. operation (to give output in the b.c. range from a 10 metre mixer), but alteration of LC constants and emitter resistor (which controls feedback along with the coil tap position) makes this circuit good for any frequency up to 60 Mc.

tion, besides providing station addresses necessary for QSL cards.

Our copies direct from the publishers: O. Lund Johansen, and Technical Book Co. P/L, 295 Swanston St., Melbourne. Local price 31/- plus postage.

SUPER RADIOTRON VALVE MANUAL, RVM-4

This publication, quarto size, of 118 pages, is published by Amalgamated Wireless Valve Co. P/L. It is an essential data sheet on the majority of receiving valves which have been divided into eight groups. Each page has the set of essential electrical characteristics relating to the valve, arranged in numerical order, commencing from type 00A. The opposite page then gives the valve base connections. Having used this manual for some time, it can be said that it is very concise, easy to use, and provides that data most needed for the general run of applications. However, your reviewer thinks that for more technical applications where other valve parameters are required, differing from those given, a conversion chart would be of assistance. These graphical charts enable the reader to establish operating conditions at differing electrode voltages.

One chapter provides a useful list of valve equivalents, but cannot list all possible combinations. Fictional tube data will prove of value to the t.v. serviceman, as an interchangeability list is given. The field of semi conductors is covered by adequate data, and a very useful transistor interchangeability guide is provided.

For anyone requiring essential basic valve data and socket connections, this is a very useful book.

Our copy from A.W.V. Co. P/L, 47 York St., Sydney. Price 17/6 each.

RADIO AMATEUR'S HANDBOOK (A.R.R.L.)

The 39th edition of this long established guide to Amateur Radio follows the layout of the past editions. This year, however, the publishers have changed their type face and paper quality, resulting in a cleaner appearance and a different feel to the book.

The twenty-five chapters cover, in broad principles, the facets of Amateur Radio based upon American practice. The main constructional articles have been reprinted from "QST" and are the best of their type. The five hundred and ninety pages cover every aspect of the Amateur, and a very comprehensive chapter provides valve characteristic data.

The chapter heads are: Electrical laws and circuits, vacuum tubes, semi conductors, h.f. receivers, h.f. transmitters, superheterodyne, keying, speech amplifiers, a.m., s.b., transmission lines, antennae, v.h.f. receivers, v.h.f. transmitters, v.h.f. aerials, mobile operations, construction practices, measurements, b.c.i. and t.v.i., station operating practices, and vacuum tube data. A large advertising section provides useful information.

This book has long been accepted as the Amateur's reference, and the new edition comes up to the standard set by previous editions.

Our copies from McGill's, 183 Elizabeth St., Melbourne, and Technical Book Co. P/L, 295 Swanston St., Melbourne. Price 11/6 plus 2/6 postage.

specialised parts—all should be available locally.

The technical explanations are lucid, exact and very educating. In addition, clear circuit diagrams illustrate the book.

An excellent chapter covers single sideband theory and practices, plus details of suitable filters.

Much more could be written in praise of an excellent Amateur book, but the best thing is for you to purchase a copy for your bookshelf. Every Amateur really interested in his hobby must have this book.

Our copy direct from the R.S.G.B. and the Technical Book and Magazine Co. P/L, 295 Swanston St., Melbourne. Local price 54/9 plus 3/6 postage.

WORLD RADIO T.V. HANDBOOK

This book lists the world radio and t.v. stations, providing programme data, station identifications, frequencies used, location, and hours of service. A schedule commencing at 2330 kc. proceeds to list every main s.w. station, including standard frequency stations, up to 25,900 kc.

A mine of useful data is in this book which would be of use to the s.w.l. and anyone interested in s.w. stations. Some very interesting articles are included, one of which is radio communication via satellites.

The book commences, following the articles of general interest, with a listing of s.w. stations by countries, with Albania first. Reading this data provides some very interesting informa-

* 27 Leslie Street, Woodville, South Australia. Reprinted from VK5 Bulletin.

Book Review

THE AMATEUR RADIO HANDBOOK (R.S.G.B.)

Every now and then a book appears which demands the very finest of recommendation, and such a book is the third edition of the R.S.G.B. Radio Handbook. The first edition was printed in 1938 and has sold some 190,000 copies.

This book is ideally suited to Australian practices, as the parts referred to are locally available and the G limit of 150 watts is the same as VK land. Thus this book could be written for Australia.

The chapters are: Fundamentals, valves, semiconductors, h.f. receivers, v.h.f./u.h.f. receivers, h.f. transmitters, v.h.f./u.h.f. transmitters, keying, modulation, sideband, f.m., propagation, h.f. aerials, v.h.f. aerials, noise, mobile, power supplies, interference, measurements, operating techniques, R.S.G.B., general data, and an index.

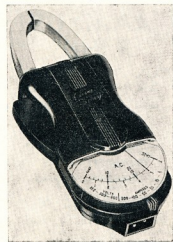
It can be said that this book is the best book of its type yet read by your reviewer. It is thoroughly recommended to every Amateur, who will find a wealth of information, both technical and practical within its covers.

The circuit description of the h.f. communications receiver is worth the cost of the book, as it fully describes a unit which should equal any unit available today, and this receiver does need

Trade Review

WESTON "CLIPPER"

Sangamo Weston announce through Warburton Franki Industries the release of the Western "Clipper", an easy to use compact and light weight clip-on a.c. volt ammeter designed for the electrician, maintenance engineer and serviceman.



Three voltage ranges (150, 300 and 600) and six current ranges (6, 15, 30, 60, 150, and 300) are provided on one clear easy-to-read scale approximately $2\frac{1}{2}$ " long. The "Clipper" is supplied complete with soft plastic carrying case and voltage test leads with insulated clips and accessory probes.

Full technical information is available from Warburton Franki offices in Queensland, New South Wales, Victoria, South Australia and in Western Australia from Tough Instrument Service Co.

LAG-65 AUDIO SIGNAL GENERATOR

Regrettably these days the term signal generator is applied to any piece of gear, which may or may not meet the specifications for a signal generator. This comment does not apply to the LAG-65 which is a precision piece of test equipment.

This apparatus generates, by a resistance bridge network, frequencies from 11 c.p.s. to 110 Kc., each frequency band being measured by a counting circuit, no calibrated dials are used. The output voltage is metered by a diode network connected into the input side of the precision output attenuator, which provides millivolt steps up to 1 volt across 600 ohms, in addition 0-10 volts are available across 10K ohms. The output is always monitored by the output meter, which, like the frequency meter, is a large four-inch clear view type. It was noted that at 100 c.p.s. the meter was resonant.

The unit uses seven tubes, weighs about 17 lbs. and is a compact, well designed, functional piece of gear, which can be fully recommended to anyone needing an audio frequency source with an accuracy of $\pm 1.5\%$ to 11 Kc., and

$\pm 3.5\%$ to 110 Kc., with a harmonic distortion of less than 0.1%. It forms part of an integrated line, which features a very wide variety of equipment.

Our sample from Electronic Industries Imports Pty. Ltd., 138 Bouverie St., Carlton, who distribute these units for £21/14/0 plus tax if applicable. The price is subject to change.

THE 9K-59 RECEIVER

This is an all-wave (540 Kc. to 30 Mc.) receiver using eight valves and rectifier. Electrical bandwidth is available for each Amateur band and a smoothly functioning tuning mechanism is used.

Excellent mechanical and electrical construction techniques result in a set which is simple to handle, but the Q multiplier setting is a little tricky until it is mastered.

A 6BA6 r.f. stage feeds the first detector, a 6BE6, which is fed by another 6BE6 used as the oscillator. A 6AV6 is used as the Q multiplier connected into the 1st i.f. stage which uses a 6BA6; in turn this feeds into the second i.f. (6BA6) thence to the 6AV6 detector. The audio output stage is a 6AQ5. The b.f.o. is taken from the Q multiplier, hence both cannot be used together. A most effective S meter is set into the tuning dial unit.

A full range of controls are provided in this communications receiver, all of which functioned smoothly and effectively. The function switch provides for standby operation, and acts as the Q mult. setting; selectivity being set by the Q mult. control. A b.f.o. pitch control is provided, plus band selector, i.f. gain control, aerial trimmer, a.v.c./m.v.c., i.a.n.l., main tuning and bandspread tuning.



On-the-air tests showed that the unit was free from cross modulation and had adequate bandspread for Amateur use. Regrettably band conditions were very poor during the testing period, but this unit proved that it could match equivalent sets selling for higher prices. Stability and freedom from drift were very good, and s.b. could be resolved. The Q mult. proved effective.

Purchasing such a set may seem expensive, but if its re-sale value is taken into consideration, then the initial price is a lot less. This set is good value for the purchaser.

Our set from both Ham Radio Supplies, 3a Melville St., Hawthorn, and Electronic Industries Imports Pty. Ltd., Bouverie St., Carlton. Prices available upon application.

TROG MULTIMETER

This pocket size unit proves that compactness does not require poor finish nor the sacrifice of needed features. The unit has volts, d.c. and a.c. ranges covering from 6v. to 1200v. in five steps, at 20K and 10K ohms/volt sensitivity; in addition it has three ohm

ranges, and measures from 50 to 3000 H., and capacity from 0.001 to 0.2 μ F., thus covering the most needed inductance and capacity ranges.

A solidly made reliable unit which features excellent damping on the movement which was very well balanced. The price is attractive at £24 plus tax if applicable.

Our sample from Electronic Industries Imports Pty. Ltd., address above.



LOW COST S.B. TRANSMITTER

(Continued from Page 11)

For the p.a. disposals equipment again provided many parts. A T.U.B. tuning unit provided the plate tuning condenser, r.f. choke, and the h.v. mica condensers, together with the pi tuning coil and the dials. The meters were taken from an AT5 unit and an old two-gang broadcast tuning condenser was used for the aerial loading position.

The power supplies are two 100 ma. power transformers rated at 385/0/385. The control circuits are wired so that the v.f.o. runs continuously and you only break the h.t. to crystal oscillator, the rest of the transmitter then going on stand-by.

Having built this unit you will find that you possess a simple yet effective s.b. rig capable of giving you many contacts. Already I have worked W, KH, ZL, VK0 (all on 20 meters), plus VK and ZL on 40 and 80 meters—not bad for 10 watts.

The main reason for writing this article was to show that it is possible to get going on s.b. without spending an extensive sum of money. My rig cost me a cash outlay of £5, mainly for the chassis, diodes and the P.S.N., the remainder of the parts coming from my own junk box. No doubt you will also be like myself and start thinking about a final to attach to this rig, then put the lot in a cabinet, and so possess a nice table-top s.b. rig alongside the station receiver. Good DX to you, too.



R.S.G.B. HON. CERTIFICATE MANAGER

The Council of the Radio Society of Great Britain has appointed Mr. K. A. Y. Hurrell, G3XV, to the office of Honorary Certificate Manager of the Society in succession to Mr. G. E. Verrill, G3EFC.

Claims for R.S.G.B. Certificates must in future be sent by registered post to R.S.G.B. Headquarters, 28/30 Little Russell St., London, W.C.1, for recording and acknowledgment. Cards must NOT be sent direct to the Honorary Certificate Manager.

After examination Mr. Hurrell will return the cards to the claimant together with the appropriate certificate, provided the claim is in order.

If a claimant requires his cards to be returned to him by registered post sufficient extra money must be sent with the claim. R.S.G.B. certificates are issued free of charge to members of the Society and on payment of 7/- (8/6 Australian; \$1.00 American) per certificate to non-members. The Empire DX Certificate can only be claimed by those who have been Corporate members of the R.S.G.B. 1/2 at least three consecutive years up to the time of submitting the claim.

A leaflet setting out the rules of all R.S.G.B. Certificates and Awards and a List of British Commonwealth Call Areas can be obtained on application to R.S.G.B. Headquarters (address above).

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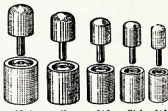
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Sub Editor: ROBERT YOUNG, W1A-L3076.

14 Alverna Grove, Brighton, Victoria

ADDRESS CORRESPONDENCE FOR THIS PAGE DIRECT TO THE SUB EDITOR

VICTORIA

Last general meeting of the Group, 11 members were present. This meeting was, I think, the shortest on record, it lasted for the great length of exactly 22 minutes. It seemed that all members in attendance were very quiet in making their presence known. However, Craig Cook broke the silence in saying he heard a 20 mhz signal, which was travelling from Melbourne through to Alice Springs.

Directions were given for the visit to Diggers Rest which was arranged for the 1st June. Unfortunately the Diggers Rest visit was rather poorly attended, a total of seven members turned up, not nearly enough I think you will all agree. However, a very interesting evening was had by all.

Our next visit for the month of July on the 6th will be to the Moorabbin and District Radio Club at 8 p.m. Hope to see a lot more in attendance than the last visit. So hope to see you there, it promises to be an interesting night.

Mac L3074 has at long last assembled his 40 ft tower which is under writing these notes, is about to be lifted upright and bolted down to the foundations. When erected a three element 20 mhz full-size beam will be sitting on top of it so with this fairly new rx (HR8-16) and prop pitch motor and turning indicator, should be able to hear a lot more DX.

Maurice L3055 has recently purchased a new piece of electronic equipment, it being a New-Heraflex S89. The rx is a battery-electric radio from the 1930's, but it is very good. He is very pleased with the results and is planning to take it over to VK7 land when he goes on holiday in the near future. He must ask you all not to laugh at this chap, but yours truly has got the one and only 2 mhz xtal locked converter working. It actually receives signals on the 2 mhz band. The best DX heard to date is from Geelong, with dozens of locals, so with having to dash outside and swing the beam, the time got much to the rx station has stopped transmitting. It seems the only solution is to connect a motor to it.

Noel L3101 says never give up hope when a report is sent out. On 29/1/61 he sent a report on 10 mhz, and was applying for information about 16 months later. Then again on 29/8/61 sent a report to 6BM and received his card approx. 14 months later.

SOUTH AUSTRALIA

Garry L5026 received word in May from the P.O. that he had success in passing the last A.O.C.P. examination and was applying for a Z call in the near future. John Lehmann and Colin were unsuccessful in passing the radio theory, but both passed the regulations. Listening at Colin's QTH has been rather limited of late. He is hoping soon to receive a Z call for his main rx on 6 mhz and then will proceed to get it operating on 6 mhz after the coils are changed from 3 mhz.

Dale G2247 has now a 10 mhz 6 mhz and 5 plus signal. The tx is being fed into a 5 element beam which has only half a reflector, with the second beam at 30 degree to the antenna and the other elements. However, it's still radiating the signal. Garry received Dale on a converter feeding into his main rx at 4 Mc. The antenna is a 4 element beam on top of a 30 ft. tower that has recently been erected.

The meeting at the QTH of John Lehmann on May 11, in which Dale resigned as Secretary of the VK3 S.w.I. Group. However, Trevor L5028 was nominated to the position of Secretary pending approval from the W.I.A. and other members.

RADIO MAIL

The mail received this month is from the following: Peter Drew, Craig Cook, Eric Trebilcock, Greg Johnston, Chris Abernethy, John Douglas, and at least 10 others.

Peter L8021 has found 20 mhz fair in the afternoons to W. land, Europe and Central America, but not during the day. He has been out early evenings and later to J.A. The Ws also are come in during the morning up to about 9 a.m. Peter and I have recently installed beam phones to the rx and is finding them a little cleverer than the speaker, and now nobody can start calling what is going on. A converter is on the drawing board and when built will cover the 16, 13 and 11 mhz broadcast-

ing bands, also 15 mhz and possibly 10 mhz Amateur bands, if licence permits. The weather in VK3 has been really rough with strong wind and driving rain which needless to say was a bit of a nuisance on the antenna. Cards received this month are from HB9EU, OZ4FL/MM and H52M.

Craig L3093, who is a new one to the page, has a No. 11 transceiver, covering 42 to 7.5 Mc. Info which was a 12-tube xtal locked 2 mhz converter feeds in at 4 Mc. The No. 11 power supply has not been converted to a.c. and it now running off a 12-tube battery which doesn't become awkward in the bedroom. The antenna for 2 mhz is a seven element yagi up to 30 ft. and is rotated by a "Gill" motor. Craig is working on a direction indicator so as to see in what direction the beam is pointing. He is also trying to purchase a Command rx to tune into 4 mhz into which would be the converter. If a Command cannot be found, a five-tube rx will be built up and used as an i.f. rx only. When these complications are over a 6 mhz converter and antenna will be constructed. A card was recently received from UE3BQL/SU. So an all call areas of VK have been heard and confirmed; a total of 28 countries have been heard with two confirmed.

Now a few words from Eric L3042. Firstly my apologies for not being able to write for 50. Now over to Eric for some QSLs received: AP5PC, HK7UL, JA6AK (3.5 Mc), KC3SS, KV4CI, W1A, A1A, A1A, A1A, A1A, A1A, UP2KBA, VK5XK/VK9, VS4RS, W3KQT (K3 Mc.), ZK2AD, ZS1OU. Also had QSLs from mobile marine stations as follows: LA3LIE/MM (7.5 Mc.), LA3LIE/MM (7.5 Mc.), VK7BT, KOGVB/MM (icebreaker, Burton Island). This makes the marine mobile score up to 133. Eric has also received a card from a 20 mhz station, any other 8AU, S.W.P. can beat it. The call signs are VK8 AU, 5B1's, 8RA, 8NK, 8TF and 8UX.

Greg Johnston, from VK1, has decided to pass on his activities. Since last we have shifted QTH, got married and set up a new shack and antenna system. Needless to say he has not much time to write for the magazine.

The new antenna system now is a GSRV (multi-band) about 15 ft. high at present with 20 mhz spaced running along east and west for the long path signal at 20 mhz. It's quite good during the past few days, though the power noise free (almost anyway) location is not much to do with the previous one, it's easier. The new rx, a 12 tube home-brew superhet tuning 450-850 kc., will be fed by the present xtal locked converter, and is almost finished to the testing stage. During 1962 Greg has heard 92 countries, of which 79 have been on s.w.b. with the remainder on a.m., which were all heard on 20 mhz. The zone tally for 1962 is 31 s.w.b. and 20 on a.m.

Chas. L2211 has increased his DX score slightly, mainly due to receive few confirmations. QSLs received on 14 Mc.: T12JCL, C1GTF, PB5CM, ON4HF, HB9MX, G3JFF/MM. On 10 Mc.: LA3LIE/MM, A1A, A1A, A1A, A1A, A1A, Chas. has now confirmation on 50 Mc. of the four LZ districts twice, which has made him very happy with himself.

Received a letter from my old pal, John Donald, L3087, the other day. He has recently joined the N.S.W. and is now training in the Apprentices Training Establishment, Quakers Hill, N.S.W. He has not been able to do any listening as a rx is not available. He is wondering if any of the members have a good circuit of a rx. If so, the circuit could be forwarded to him. The magazine "A.R." is being posted from him from Melbourne and is following the movements of the Amateurs and S.w.I. although the s.w.l. page is more interesting (hi).

Len and ZS8R has had much more time to listen around the bands. Conditions have generally been pretty bad, but at odd times 20 mhz comes good and a few stations can be heard. Len has KJ6BY on 7 Mc. s.w.b. the other night. So far this year the total logged is 60 countries, sent out 86 cards. Since the start of the year he has received four returns. The 6 mhz tx is on the move once again and a start will be made on 10 mhz. The antenna is a 5 element beam, a new rx was lugged home to the QTH, it being a BC48 which is performing very well. Stationed from W. land have been heard on 40 mhz s.w.b. They are not very strong but are perfectly readable. Most of them can be found around 720 kc. It is a wonder not more countries are heard on this band. It seems possible if the Ws realise they are being

heard regularly on this band, they would look more often in this direction for contacts.

Well gentlemen, that seems to be the end of news from here. Hope to be hearing from a lot more members in the not distant future. 73, and the best of DX. Robert L3076.

DX LADDER FOR JULY 1962

	Countries	Zns	S.w.b.	W
E. Trebilcock	277	40	34	30
D. Grantley	101	249	14	90
A. Wescott	84	189	31	93
M. Hillard	69	210	33	105
M. Cox	65	215	26	123
C. Abernethy	37	81	24	—
N. Harrison	34	81	24	—
P. Drew	33	180	19	70
P. Fields	26	133	—	—
L. Thomas	17	133	16	86
H. Burgess	16	141	—	—
H. Burgess	6	185	5	19



Correspondence

Any opinion expressed under this heading is the individual opinion of the writer and does not necessarily coincide with that of the publishers.

805 AS G.G. LINEAR

Editor "A.R." Dear Sir,
I would like to put forward the suggestion that a Question and Answer column be included in "A.R."

For example, I have tried in vain to determine the correct operating conditions using an 805 as a grounded-grid linear amplifier. If a reader could assist me, and particularly how much driving power is required, I would be most grateful.

[The Editor points out that a previous "Question and Answer" column lapsed due to lack of support. Readers are free to use the Correspondence for this purpose.]

CHANNEL ZERO

Editor "A.R." Dear Sir,
With typical Australian lethargy, I have heard and read many provocative pieces, without doing a darned thing to register approval or not. However, the frequency of this Channel 0 has been allocated in VK4 and VK3, is just pushing things too far.

Quite apart from the Amateurs' viewpoint, as expressed in "A.R." (June '62, page 37, centre column), does the average John Citizen realise, or has he been told, what type of interference the frequency of 7.144 Mc. has been allocated in VK4 and VK3, is just pushing things too far. Frankly, I feel that many newspapers would be only too pleased to give us a good (7) tidings, without technical frills, were they acquainted with the position, and if further allocations are made, the position will worsen a hundredfold. Perhaps we should adopt a "Polyana" attitude, and declare what fun it will be to fill our logs with DX tx. stations.

Well, thanks for reading this far, and I certainly hope the VK2 Group aligns itself with VK4 and VK3, in fact, all of VK, and make a firm stand on this most absurd situation.

—Terry J. Brown, VK2ZBL.

APOLOGY

Editor "A.R." Dear Sir,
I wish to apologise to VK5WT and its listeners for the QRN on 7146 Kc. on 27th May. I had "lowered" the frequency of 7146 Kc. to 7146 Kc. with applications of microphone and omitted to switch the rig to the v.f.o. which was why the QRN was there, and was listening. This I did not notice until I tuned to 7146 Kc. for the VK7VI broadcast. There is no pardon for this sin and I can only offer my sincerest apologies. The crystal has been shelved.

—F. E. Nicholls, VK7RY.

ERRATUM

The letter on "Good Music" ("A.R." June 1962, page 22) was incorrectly signed R. L. Gourd instead of Dr. Douglas. VK6ON, of 5 Mason's Parade, Gosford, N.S.W.

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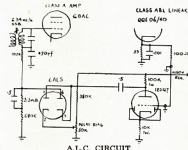
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SIDE BAND

AUTOMATIC LOAD CONTROL

A.L.C. works very much in the same manner as automatic volume control in a rx. The purpose of a.l.c. is to reduce the exciter gain whenever the drive to the final amplifier exceeds a certain predetermined level. This means that properly adjusted, the final amplifier can never be overdriven, can never cause all that splash and splatter that causes such a nuisance on adjacent channels. No sideband tx should be without some form of a.l.c.

Lance 2AHL has developed an interesting automatic load control circuit for use in his 50 Mc. tx using a QQ026/40 tube as a final amplifier. This tube is operated in Class AB1. The voltage across the 33 ohm resistor in the cathode of the QQ026/40 tube varies according to the instantaneous values of plate current, developing a positive going waveform at the cathode. This is amplified and inverted by the 125Q7 tube, resulting in a negative going waveform to be applied to the 6AL5 tube used in a voltage doubler circuit. This circuit



has a delay voltage applied to it so that rectifying action starts at a set level. The attack time is very fast and is determined by the 680K resistor, the 100K resistor and the 470 pF. and 0.5 uF. capacitors. The decay time is long, set by the 1.5 uF. capacitor and the 2 megohm resistor to provide hang between syllables.

Between the 6BA6 amplifier and the final, there is the gain of a mixer and two linear amplifiers at 50 Mc. One important consideration is that when the final first switched on, the voltage at the cathode rises from zero to a small positive value (assuming no driver which is determined by the standing cathode current). This can transmit a pulse into the time constant network and result in paralysis

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of the tx for a short period after going to transmit. This effect was overcome by adjustment of the delay voltage. It is more serious on c.w. but switching the 125Q7 tube grid to ground would eliminate the trouble for this mode. The 100 ohm resistor in the 125Q7 grid lead is to ensure that the only low impedance path for the final cathode is the by-pass capacitor. This is important at v.h.f.

STILL MORE ON THE VICEROY

Again from Geoff 3AC, more information on modifying the Viceroy tx has come to hand. Geoff has been over his Viceroy with a fine tooth comb or should it be a careful soldering iron. Geoff pointed out in his letter to me that these remarks should not be taken as a reflection on this publication who puts out a fine signal straight from the factory, which one must remember is 12,000 miles away.

Here is how Geoff told the story of his improvements: "I was troubled with a pop in the carrier, incomplete carrier suppression, although this was always very good and well down, a growing tone of audio w.f. being reported, and on c.w. clicks were troublesome and there was a pulling of frequency when keying the rig which indicated the presence of audio might also be producing slight frequency modulation."

So here's a report on what was done, step by step.

1. Ripple. A dry joint on an 8 uF. condenser on the 250 volt line inside the rig was the cause of this.
2. 100 cycle modulation in early stages of exciter. Probing around the power pack with a 0.1 uF. condenser with one side connected to the positive rail of the power supply and the other to the 100 cycle noise. 0.1 uF. paper condensers were connected parallel with electrolytic condensers of the 250 volt line. A 0.1 uF. mica condenser between one plate of each rectifier and the cathode of each rectifier eliminated a 50-cycle tone and also the 100 cycle rectifier modulation. Test to determine on which plate the condenser is effective. Another 0.1 uF. mica condenser between the live side of the a.c. supply and the positive rail of the power supply. The 100 cycle noise and the 50 c.p.s. flutter due to rectifier action.

3. The 100 cycle noise and the 50 c.p.s. lack of highs. The six i.f.t. slugs involved in tuning up the lattice filter to the frequencies already recommended in last month's notes resulted in a big improvement in the position of the pass band. But in my case, I found that it was a further improvement to shift all the frequencies concerned 375 cycles lower than those recommended. This was done quite easily using the low frequency range of a BC221 which was most satisfactory for the job. It was necessary only to connect the output of the BC221 through a length of co-ax to the grid of the carrier oscillator tube. This resulted in the wavemeter supplying the carrier frequency for tuning up and caused the crystal to stop oscillating at the same time.

The S meter of the rx was used as a v.t.v.m. for all measurements and peaking up was found to be most suitable for the purpose.

Shifting the frequencies a further 375 cycles away from the carrier frequency resulted in retention of the low frequencies and an extension of the top end to 3.5 kc.

Further attenuation of low frequencies was achieved by inserting a 1,500 pF. condenser in series with the 0.01 uF. grid coupling condenser between the two audio stages in the rig. In addition, a 5,000 pF. condenser was connected between the grid of the modulator and ground to take care of higher frequencies produced by the microphone and eliminate possibilities of these causing a broadening of the signal.

After all this, the response curve of the rig was flat from 600 c.p.s. to 3.5 c.p.s., 20 c.p.s. and 4,000 c.p.s. response was down 20 db.

Suppression of the lows improved unwanted sideband suppression and this would now be around 35 db. for the middle range of frequencies and higher for the highest and lowest frequencies within the range of the pass band.

The voltage regulation was checked and it was found that the voltage was varying on the carrier and v.f.o. oscillators during modulation. Further checks revealed an error in the connection to the QQ026 tube which was only partly controlling. The connections to the socket had been reversed. Correctly connected,

the OA2 controlled the supply to the two oscillator stages and there was no tendency for these stages to pull off frequency with modulation.

On c.w. it was noted that a slight frequency change still took place on the four higher frequency bands but on 80 m. and 40 m. the v.f.o. frequency itself is used, but on the four higher frequency bands a xtal oscillator is used to beat against the v.f.o. This indicated that regulation on the c.r.o. stage was inadequate. A VR tube on the screen grid of the 1870 c.o. tube cleaned up this last little regulation problem and it was felt that we were now really in business for good clean s.b.s., and this was borne out when a prerecorded musical type was played through the rig into a dummy load. It was possible to listen to music of very good quality considering the limited frequency range of the pass band. I would recommend using a microphone to listen with music and speech for the purpose of testing a s.b. rig. Music will very quickly reveal poor regulation which results in changes of pitch which can be very quickly discernible with a musical note, and less so with the voice. It is almost impossible in any case to form any sort of judgment when listening to music with speech and making adjustments. The disc or tape source of music and speech will help to check on performance. Distortion more readily noticed using music and I would say that many of the troubles normally only discernible by using a c.r.o. can be discovered and eliminated by listening to music.

If, when playing music through your s.b. rig, you find that quality is poor, something is wrong. You can't expect perfect quality when the rig is correctly adjusted and adequately controlled in regard to voltages and frequency. In measuring the response of the rig, the signal as the audio frequency is increased is of course necessary. To measure the r.f. output use the S meter of the rx, but follow the signal as the audio frequency is increased otherwise the shape of the rx pass band will wreck the picture you will get of this tx's response to music.

A 1,000 ohm resistor and 4 uF. of capacity cured key clicks, on c.w. There is absolutely no change in carrier pitch when the key is released. The carrier frequency is increased by critical adjustment of the trimmer condenser, the Philips trimmer across the carrier oscillator. The carrier frequency is controlled by the Philips trimmer. Final adjustment was made with the rig partly out of the cabinet and the middle finger used to make final slight adjustments to the Philips trimmer. Carrier then disappeared beneath the tube noise and to all intents and purposes could be regarded as having been completely eliminated. This was a most satisfying exercise. The adjustment to the Philips trimmer gets the carrier frequency right into the notch of the carrier crystal in the lattice filter and the carrier completely balanced out.

TWENTY METRES

In the February "Sideband" magazine and the April "CQ" there appeared a discussion on 20 mc frequency segments under the title "Something Must Be Done". At present there is no way to make the American phone band 14100 to 14300 kc. This means that the s.b. DX has only 20 kc. at the top end and leaves a mere 400 kc. to the DX a.m. operator. This gives the a.m. chaps twice the frequency space as the s.b. gang, but in actual fact the effect is sparsely equal. However, this proposal would meet with much opposition.

The S.S.B.A.R. suggest that the U.S. s.b. portion be widened to 14250 kc. to 14350 kc. and that the DX s.b. stations (you and me) use 14100 to 14140 kc. At present there are 20 stations, indicate where they are listening between 14250 and 14300 kc., leaving the top 50 kc. for internal W/K contacts and phone-patching.

I go along with this proposal and it is very similar to that put forth by VEBWVY some time ago. There are many DX stations using 14100-14130 kc. to great advantage, so that it seems that the last mentioned plan would be a real howler. However, there is little or no U.S. to DX contacts occurring from the high to the low end, and I feel that this is a matter for other than U.S. stations to start. Once established, the custom would be easily adopted.

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FEDERAL AND DIVISIONAL MONTHLY NEWS REPORTS

(SEND CORRESPONDENCE DIRECT TO DIVISIONAL REPORTER NAMED AT PARA. END)

FEDERAL

FEDERAL EXECUTIVE MEETING

The first meeting of the 1962-63 Federal Executive was held on 16th May. Present were W. Mitchell, VK3UJ (President); G. M. Hull, VK3ZS (Vice-Pres.); J. Lancaster, VK3JL (Sec.); D. Rankin, VK3QV (V.H.F. Manager); J. MacMillan, VK3JL (V.H.F. Manager); J. MacMillan, VK3CS (Publicity Manager) and I. MacMillan, VK3CS (Publicity Manager). Co-opted members present were W. Boase, VK3MI (Treas.), and G. Glover, VK3AG (Historian and Emergency Co-ordinator). Another member co-opted during this meeting was K. Cocking, VK3ZFG. Others not present were A. Tinkler and T. Straughair.

The transcript of the proceedings of the Federal Convention held in Perth at Easter was tabled, and it was decided that it would be sent to be corrected before copies were distributed to the Stations for ratification of the proceedings by the Divisions.

A copy of a letter from the Elizabeth Amateur Radio Club to the South Australian Division, which had been forwarded to F.E. for information, was tabled, and discussed. This letter criticised various aspects of the Institute, and while most of the matters were discussed in nature, some matters of a Federal nature were raised. These were:

(1) Veracity of articles published in "A.R." Every effort is made to ensure the correctness of articles published, but it is almost impossible for an over-worked voluntary committee to examine every detail of every circuit, and every equation, or to pass on technical concepts that are the subject of contention by experts.

(2) Short supply of Call Books. It is apparent that Divisions are reluctant to order large quantities of Call Books for fear that they may be out of date. The South Australian Division prints on the basis of orders from the other Divisions, and known retail demands, and has to bear the cost of over-printing, they are reluctant to print more than is actually ordered.

(3) Novice Licences. This matter was recently brought to the attention of the Department and was rejected. However, the matter is not considered to be closed.

A letter from the N.S.W. Division, enclosing literature pertaining to that Division's excellent High School Radio Instructional Certificate, was tabled, and was decided to obtain a quantity of literature from N.S.W. for distribution to the other Divisions for their information, with the suggestion that they investigate the possibilities of duplicating the scheme, using basic material originated by the N.S.W. Division.

The scheme involves courses of instruction for the High School students, with certificates issued on examination, in stages, from an elementary level to a certificate A.O.C.P. level, including "Morse Instructional Certificates".

Specific discussion of some fifty-five motions discussed at the Federal Convention is expected in the next meeting of F.E. which will have been held on 13th June.

OVERSEAS NEWS

By the time of issue, Oscar II, the second Amateur Satellite will be in orbit, and observations taking place. This satellite will be a duplicate of the first. A third Oscar package is planned for the future.

V.H.F. STATE RECORDS

New South Wales
144 Mc.: VK3UJ-JA10N, 480nm., 1/4/56.
*144 Mc.: VK3ASZ-ZL3AQ, 132nm., 31/12/61.
288 Mc. and above: No claims.

Victoria
50 Mc.: VK3ALZ-XE1FU, 841nm., 1/5/59.
*144 Mc.: VK3ZCG-VK4HD, 887m., 27/12/61.
288 Mc.: VK3ZCG-VK4HD, 887m., 27/12/61.
576 Mc.: VK3XA-VK3AKE, 90nm., 11/12/49.
2300 Mc.: VK3XA-VK3AN, 8.1m., 18/2/50.

Queensland
50 Mc.: VK4ND-JA14HS, 414nm., 22/1/56.
*144 Mc.: VK4ND-VK3ZCG, 887m., 27/12/61.
288 Mc. and above: No claims.

South Australia
50 Mc.: VK3KL-WTACS/HK4, 536nm., 26/8/47.
144 Mc.: VK3KL-WTACS/HK4, 536nm., 26/8/47.
*144 Mc.: VK3ASZ-ZL3AQ, 132nm., 31/12/61.
576 Mc. and above: No claims.

Western Australia
*50 Mc.: VK3BE-JABRP, 549nm., 30/10/58.
144 Mc.: VK3BE-VK3ZGL, 132nm., 30/12/51.
288 Mc. and above: No claims.

Tasmania
50 Mc.: VK3TQ/TLZ-VK3DB, 226nm., —.
*144 Mc.: VK3TLZ-VK3DB, 60nm., 28/4/59.
288 Mc.: VK3TLZ-VK3ALZ, 262nm., 10/1/60.
576 Mc. and above: No claims.
*New records.
*New Australasian 144 Mc. record.

Other contacts, no records, that have been submitted for recognition are as follows:—

144 Mc.: VK2AL-ZL3AR, 1307m., 15/12/51.
144 Mc.: VK2ZAL (now VK3JX)-VK3BC, 60nm., 18/1/58.
144 Mc.: VK3BC-VK3TF, 571m., 28/4/59.

NEW CALL SIGNS (MARCH)

VJ—Australian Capital Territory
1JW—J. W. Miles, 2 Torres St., Red Hill.
1JW—J. B. S. Waugh, 20 Hamelin Cres., Narreah.

1KG—K. G. Avery, 89 Hawdon St., Dickson.

New South Wales

2CT—R. B. Pinney, 23 Rickard St., Narrimoo.
2NO—D. G. Hallam, 3145 Moira Cres., Randwick.

2FAO—T. G. R. Nolan, 14 Dennis St., Rydalmere.
2AUD—J. M. T. Davies, 100 Barrenjoey Rd., Mona Vale.

2AVU—J. R. Copley, 46 Undercliffe Rd., Harbord.
2AYG—E. J. Briggs, 56 Oakley Park Rd., Oakley.

2AYR—W. A. Rowse, 28 Central St., Broken Hill.
2ZDI—D. W. Rickard, 16 Glen St., Milsons Point.

2ZMI—M. K. Takacs, de Duke, 314 Miller St., North Sydney.

Victoria

3CV—K. J. Duff, 10 Stanley Gr., Canterbury.
3CR—A. L. Heath, Main Rd., East Eltham.

3SR—A. B. Russell, 1 Cedar Cr., Forest Hill.
3ER—A. J. Perkins, 1 Parkmore Rd., Forest Hill.

3JWA—J. H. Walker, 27 Dundas Pl., Albert Park.
3JW—J. H. Walker, C/o. O.T.C., Flinders Park.

3JAV—C. Lobb, 20 Elgar Rd., Box Hill South.
3ZMN—R. K. Von Sanden, 42 Moyston St., East Hawthorn.

3ZNE—R. W. Birrell, 33 Bakewell St., Bendigo.
3ZOA—T. R. Powney, Anzac Ave., Leopold.

Queensland
4RX—B. R. Rickaby, 43 Curzon St., Tennyson.
4WY—W. S. C. West, 35 Darling St., Marri.

South Australia
5ZCZ—C. A. Schahinger, 39 Miller St., Darlington.

5ZHR—R. W. Haase, 18 Orlando Ave., Hampstead Gardens.

5ZIS—J. K. Barker, 47 Mackay Ave., North Plympton.

5ZJK—M. W. McLennan, 11 Herbert St., Cheltenham.

Western Australia
6AQ—Rev. Bro. V. R. McKenna, C/o. Aquinas College, Perth.

6DK—N. R. Fenfold, 55 Moulden Ave., Mt. Yokine.

6ZDN—J. S. Brown, 32 Reynolds Rd., Applecross.

Northern Territory
8CP—A. R. Jarman, 10 Wallis St., Alice Springs.

Territory of Papua and New Guinea
9JB—J. Bohu, C/o. A.W.A. Ltd., Goroka Airport, Goroka.

AMATEUR ADVISORY COMMITTEES, 1962
New South Wales: Messrs. W. L. Woolnough, VK2GW; L. H. Taylor, VK3CL; N. MacNaughton, VK3ZH; G. G. Hall, VK3AGH; B. H. Anderson, VK2AD; Dr. L. H. McMahon, VK3ZC.

Victoria: Messrs. R. A. C. Anderson, VK3WY; P. P. O'Dwyer, VK3OF; N. L. Storck, VK3ZO.
Queensland: Messrs. S. R. Baxter, VK4FJ; C. I. Patterson, VK4FV; A. Collins, VK4XJ; K. D. M. Grice, VK4DG; C. E. Cogwell, VK4CI; S. J. Armstrong, VK4SA.

South Australia: Messrs. K. M. Ring, VK3KH; I. B. Fry, VK3ZL; J. Cotton, VK3LW; P. R. Keddie, VK3CS; C. A. Doddridge, VK3CD; R. T. Manuel, VK3RT.

Western Australia: Messrs. W. E. Coxon, VK3AG; M. Saw, VK3SM; J. E. Rumble, VK3RU; R. Hamberley, VK3YJ; S. Stewart, VK3ZAS; P. R. Graham, VK3ZDS.

Tasmania: Messrs. W. M. N. Nisbet, VK3BN; L. Jensen, VK3TL; I. Nichols, VK3TZ; P. Reeves, VK3GV; C. Spiegel, VK3KS; E. Sear, VK3TE.

The above-named persons have indicated that they have no objection to publication of their names in the Institute's magazine "Amateur Radio" as members of the Amateur Advisory Committee.

FEDERAL QSL BUREAU

A further change in the A.R.R.L. district QSL Managers: VEA QSL Bureau, Mr. D. E. McVittie, VE4DX, 647 Academy Road, Winnipeg, Manitoba, Canada.

Am very grateful to member John Beicher, CBentley, V/c, for making available details of R.A.A.F. Receiver AR10, which was asked for in this column. Much appreciated, John.

Details of a new certificate, issued by the Zulia Section of the Radio Club of Venezuela, are available from this Bureau.

An information sheet issued for the inauguration of the Club Radio Station of the International Amateur Radio Club has been received. The I.A.R.C. has been founded at the headquarters of the I.T.U., Geneva, Switzerland, and membership is open to all club members of international organisations. Other licensed Amateurs may become members. The purpose of the I.A.R.C. is:

1. Through Amateur Radio, to further international friendship and understanding;
2. To co-operate with all Radio Amateur associations;
3. To promote the proper use of the bands allocated to the Radio Amateur Service;
4. To provide the organisation through which the I.A.R.C. radio transmitting and receiving station will be managed and operated.

The Amateur Radio Station of the Club has been installed in Room 327 on 5th Floor of the new building of the International Telecommunication Union, at the United Nations Geneva. The station has been assigned the call KUITU in agreement with the United Nations and the Swiss P.T.T.

QSL traffic through the Federal Bureau rose to 5,822 cards for the month of May. This is the highest monthly total since November 1949!

Ray Jones, VK3JL, Manager.

NEW SOUTH WALES

HUNTER BRANCH

The last meeting of the Branch was a "Do It Yourself" night, where members described some item of equipment they had constructed. Some most interesting gear was displayed and those who performed were: Stewart 2AYF, Mac 2ZAN, Stan 2ZJG, Gordon 2ZSG, and Keith 2AXX. As you can see, the list is quite long and to ensure that the list was not too long, a great deal of space. Suffice to say that practically all aspects (except s.a.b.) were covered with a goodly sprinkling of v.h.f. equipment. A very good roll-up of members and visitors, thirty-three in all, gained much useful knowledge from the evening. Thanks to all who participated.

News from the local front is at an all-time low this month and the rumour that several of our best known Amateurs have gone into hibernation may well be true. This certainly seems to be in evidence on Monday night broadcast time when very few call-backs are received. No matter how you are VK2 or Interstate, or ZL, please accept this invitation to call back to the Monday night re-broadcast of 2W. This may involve a little extra work on 1900 Eastern time on approximately 3573 kc. on a.m. telephony. The broadcast lasts about 20 minutes and call-backs are taken on the same frequency. You may use any mode, c.w. and you are assured of a cheery reply from the rostered Hunter Branch operator.

For the time being, the Hunter Branch is now to be constructing a rig for use on top band and will be looking for contacts immediately

If you have the time and you are able to drag yourself away from your income tax calculations, why not attend the next meeting? A single sideband special, it is to be delivered by Keith 2BK. Having in mind the previous lectures we have heard from Keith it promises to be a good night, so put down the ready

W.I.A. N.S.W. DIVISION

SOUTH WESTERN ZONE

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Further inquiries, contact VK2DE,
Dave Evans, C/o. Ambulance
Station, Gundagai.

YOUTH RADIO CLUBS

The N.S.W. Division has commenced a very promising project to encourage young people to take an interest in electronics and radio communications.

A very detailed scheme has been formed which will issue a proficiency certificate to those who pass the examination.

Every Radio Amateur in Australia should help to further this scheme by encouraging the young people to join.

Full details are available upon application to R. C. Black (VK2YA), 21 Bardwell Road, Bardwell Park, N.S.W.

reckoner and come along. You'll find all the boys there at the Newcastle University College. Tighes Hill—the time, 8 p.m. Friday, 13th July. Let's not be superstitious; all the ladders, black cats and mirrors have been removed for the occasion. If you enjoy meeting the boys without hearing about s.s.b., then come along to Bill Hall's Tavern, Cooks Hill, on 25th and join the billiards queue. And don't forget 160 mx. See you there, TJ, 2AKX.

BOORAGUL HIGH SCHOOL RADIO CLUB

Thanks to you, our new rig is now on the air with about 25w, on 30 and 40 mx. We do hope soon to be on 29 and 160 mx as well, but that will depend on the going of the things about the main school building. As we are able to put up a half wave dipole for 160 mx. The only thing we lack is the wire. Twenty odd feet of bare copper is all we have. We are short of hard sold wire round 18 for the big antenna. Preparations are well in hand for the Education Week open day and we hope that once again Boaragay will consist of a really big bunch of clubs on the air. We are doing the best we can to maintain our lunch and afternoon schedule as listed last month and we are still looking for more people on both 30 and 40 mx. So building is going on apace now and members are turning in increasingly towards transistors. We look forward to meeting you and renewing our acquaintance on the 30 and 40 AT.

VICTORIA

JUNE GENERAL MEETING

About 35 were present for the June meeting. Business was quickly completed and the meeting handed over to ye Hon. Ed. Kel took us on a pictorial tour of the Snowy Mountain scheme. As usual, when Kel describes his experiences of his trips, there is always a lighter side. The pity is they cannot always be committed to print.

I'm still in two minds about apologising for advertising the wrong agenda item in last month's "A.R." I still say the visit from Mr. Little was announced at the April meeting and I'm not on my own in this regard.

Anyway, Mr. Little will be with us for the July meeting, so here's hoping we see 45 members or more at our next meeting.

Again we have three new members for this month, one full and two associates. Sad to say, I've mislaid the scrap of paper with the names, but just the same, a hearty welcome to our ranks, fellows.

Just because there were a few VK3 notes last month, there was no space for 5PS, so in the interest of Interstate peace this had better be kept short, but just wait till next month.

As a final thought, all those who indicated their interest in W.I.C.E.N. will by now have received cards to be filled in and returned. Please complete and return them promptly as the co-ordinators have a lot of work to do to get the organisation functioning and late entries will only make things harder for them. Don't forget there is a place for you and we want you in it.

JUNE COUNCIL MEETING

A letter was received from a suburban member who had been refused permission by his local council to erect a wind-up tower. As it was felt that an important principle was

involved, it was agreed that Council support this Amateur to his appeal against the decision.

Michael Owen reported that cards requesting details of equipment and personal particulars had been sent to those who had replied to the W.I.C.E.N. circular.

Some time was devoted to a discussion of ways to raise the level of interest and participation in the W.I.A. in the metropolitan area. So many ideas were forthcoming that time ran out, necessitating adjournment of the discussion until next meeting.

The progress of the work on 3WI was examined, in particular the tricky problem of a suitable antenna for 80 metres. The station should be back on the air from the club rooms on 80, 40, 6 and 2 mx by the end of the month.

MIDLAND ZONE

On May 18 a meeting of the Midland Zone members was held at the residence of 3ND, Castlemaine, with the view of reviving activities within the Zone. After much discussion, various problems were resolved and new office-bearers elected. A copy of the minutes was forwarded to all members. It was decided to commence Zone book-up at 8.30 on Thursday 19th, 20th, 21st, 22nd and Sunday to participate in State book-up on 30 and 40 mx.; this arrangement to be continued weekly.

It has been suggested that the Midland Zone use a specific frequency, to be decided, by all members for Sunday hook-ups, so any suggestions on this and other matters will be welcomed; so let me have them. Just how many members will be able to participate immediately is not yet known, but let's make it a real get-together at the earliest opportunity.

At present I have no tx operating on 80 mx, but expect to rectify this matter within the next couple of weeks. Tom 3JW is keeping the Zone aloft so give him a call and let's have your notes on your activities. We don't expect wonders immediately as we all have some commitments, especially 3ACN who has YL trouble in a big way. However, he has no one to whom we should not be able to have good representation on the bands in the immediate future.

Several activities within the Zone are in the planning stage and details will appear in these notes as they are finalised. Please let me have notes of your doings members, and help keep the Zone active. My QTH is Farnsworth St., Castlemaine. 73. 3ND.

EASTERN ZONE

We all wish a speedy recovery for Robin Forman, 32LS (ex Balwyn, now of Morwell), after the tragic motor accident some weeks ago.

We all wish Graham 3GZ a bon voyage too and a enjoyable holiday in the U.K. Graham left on 20th June. Ken now has his two mx mobile rig working, into a halo on 144.665 Mc. Bert is also building up h.f. portable equipment. Alan 3ZNB now has built a shack on top of a nearby hill at Anderson. He is very active on 144.28 Mc. Alan 3ZNS is now active on 2 mx from the top of Mt. Tassie.

Our High School station, 3ANL at Morwell, is now active again, anticipating regular inter-school QSLs. Last two contacts were on 10/5/62 and 14/6/62. Stations worked were Morton High School, 3AEG; Shepparton High School, 3ACD; Warracknabeal High School, 3AMP; also 3AUL called in and contact was made with a VK2 school.

As most of you received Oscar II, and had a very enjoyable time listening, tracking and recording it, please remember now the most important duty, that is POST your report forms direct to the Oscar Association or to myself. Do it as soon as you read this, if you haven't already done so.

Everybody had a very enjoyable time with Alf and Molly at Warragul Creek field day last month. Approx. 23, including XYLs and

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"	3010	"	8 "	7/4
"	3011	"	16 "	7/4
"	3014	1" "	8 "	8/5
"	3015	1" "	16 "	8/5
"	3018	1 1/2" "	8 "	10/6
"	3019	1 1/2" "	16 "	10/6

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harmonics, turned up. Don't forget the next Eastern Zone family field day to be held at Lakes Entrance at the beginning of November. 73, 32CG.

NORTH EASTERN ZONE

To my knowledge 3GI is the only member making consistent DX contacts of late. 3AGG, the eternal dark-horse, only smiles at the subject. 3AWT has erected a 25 ft. windmill tower close to his station to mount an as yet undecided type of beam. 3ALP suffers from inertia over the mounting of his 20 and 15 mx quad. 3AUL built up a new 15 mx converter recently but has not heard any signals on it. The Zone-shattering bombshell, he said would occur soon, has not gone off—maybe no fuse.

3AAQ had a spell of winding in order to achieve a heftier h.t. transformer. Using silicon rectifiers in a bridge circuit, he has jacked up input power to 65 watts. 3AYD has also increased input power to 60 watts; there for a few days he was unable to obtain 100% modulation and all the highly technical tests did not reveal the "bug". Whilst idly poking at connections, he found a fatigued screen pin receptacle of one of the 807s in the Mod. Two days later he marked up his first DX phone contact—a VE. This calls for 807s all round next pay day?

32U reported that one member of the Yarrawonga and District Radio Club passed the theory and regs. in April. The lad concerned is feverishly building 2 and 6 mx outfits and hopes to come on the air about mid June. 3ACK having finished his 200x astro telescope, decided to have a lash at 2 mx last month. The converter worked first try and the tx gave very little trouble. The other day when he first joined in the daily sledge with 3CI and 3AFP, Syd gave him an S point over Peter. The latter is quietly crunching through his pipe stem over that!

3ACD was not able to find sufficient interest among the Shepparton High School senior students so the idea of forming a radio club has, for the time being, been shelved. VKU has the answer to the cold weather and being away from Mum; he has transferred his outfit to the kitchen. During the last couple of weeks I have contacted several VKs and VKs on 41 mx at about 1800 hrs. but I have never been able to sign off with them as their signals have faded right out in a matter of a few seconds.

The next Zone Convention looks like being held in Shepparton early in April 1953. 3ASY.

WESTERN ZONE

Guess we must welcome back to our Zone Chas., ex VRIB. Chas. has only recently ar-

rived back with Audrey and 1st harmonic after a sojourn of three years in Gilbert Islands. They are at present living in Dimboola and we expect to hear Chas on the air again soon from this location.

One of the Amateurs throughout the Zone seem to be active television enthusiasts. Believe that Keith 3ATS, of Murtosa, has almost finished building his own tv. set, Herb 3NN, of Yarram, has had a hard luck of losing his highest antenna mast in a storm, so at present is operating under some difficulties. 73, 3AKW.

QUEENSLAND

FREQUENCIES

News in Queensland this past month seems to have been of nothing but frequencies, frequencies, and frequencies. Discussions on the bands and in personal QSOs have been particularly sparked off by the Federal comment at the beginning of the last "A.R." The announcement of a re-issue of licenses which, by now should have almost been completed, was accompanied by the list of authorised frequencies for Amateurs which was conspicuous by its cuts in allocations.

Besides the abandoning of the 30 to 52 Mc. and 288 Mc. bands, the little footnotes contained restrictions which in effect will deprive service in a number of bands. Amateurs in Queensland were quick to realise the losses and a number have written personally to their local Federal members of parliament, while others have been urged to do so giving a full discussion of the issues involved.

Vince 4VJ has put forward a practical proposal to help some of those licensees almost exclusively knocked out by the announcement. He has given notice that at the next general meeting of the Queensland Division he intends to propose the following motion:

"That the Wireless Institute recommend to the P.M.G. Dept. that Z licensees be granted use of a portion of the 28 to 29.2 Mc. band in lieu of the 50 to 52 Mc. allocated for Channel 0 t.v., and that 29 to 29.7 Mc. be considered for this purpose, other aspects of their licences to remain unaltered."

Branches, clubs, and individuals were asked to notify the Divisional Secretary of their attitude to this proposal. It is to be hoped so it should not be too long before the result of the move is known. The V.h.f. Group in VK3 has been informed of the motion and asked for their opinion as members in Melbourne will be as badly off as those in Brisbane following the questionable decision on the controversial Channel 0.

OFFICIAL STATION

In a different vein on frequencies, the xials prepared for the VZGWI tx unfortunately were ground off frequency and over the past few weeks, there has been difficulty during the Sunday morning hook-up. Bert 4AO has now collected them and it's hoped to have the ones for correct frequency in service very shortly. To remind all Amateurs who operate on Sunday mornings, VK4 operators from 7146 kc. for the news and after on 7105 kc. for the hook-up. As members are listening and taking part in this from as far from Brisbane as Townsville and Ayr, a sincere request is made for all operators not involved to keep these frequencies as open as possible, having regard to the particular conditions. In recent times, unthinking band users have almost wrecked both the news and the hook-up.

Also concerning frequencies, at least one Amateur in Brisbane was able to mention one of the frequencies detailing the proposed first American high altitude nuclear blast which in fact, the blast was not that close enough to be recorded so those looking out for freak conditions to accompany proposed explosions have no excuse of missing out. Oscar II, who duly put into orbit early in June and at least three v.h.f. members in Brisbane, State co-ordinator Vic 4ZBT, Dane 4ZAX and Lionel 4ZGL had picked up the news in the first week. Although the project might be completed by now, all who hear signals are asked to contact Vic.

America's second astronaut Commander Scott Carpenter was in orbit in late May but no Amateur in Queensland is believed to have received signals on the one spacecraft frequency released by Project Mercury officials, 15 Mc. No doubt many will be listening out for the next astronaut.

FIRST COUNCIL MEETING

The new VK4 Divisional Council held its first meeting on May 17 and the following were some of the positions decided: President and Chairman, Pat 4KB (a President back in

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the early 1930s); Sec., Peter 4PJ; Treas., Keith 4DG; Inward QSL Officer, Jack 4TF; Outward QSL Officer, Peter 4VW; Club Secretary, Peter 4CJ; Country Rep., Les 4ZZ; and Equipment Officer, CQ 4CL.

Among the many visitors welcomed at the May general meeting were Bill 4XM and Jim 4HZ who delayed a trip to Gympie to attend and to comment very favourably on the standard of the broadcast. After a short, well-pointed address, Pat outlined the policy of the Council for the coming year, including a point that Amateur Radio should be 90 per cent radio and 10 per cent business. The large attendance was more than 50 was wholly in favour of this.

The money was given by Clive 4CC on the 1958-59 Antarctic team on Macquarie Island, and was illustrated with photographs of the expedition film made at the time. A small "walkie-talkie" designed by Clive and built into an average sized metal tablet container attracted much interest when it was handed around for show. Clive said that the unit worked well and filled a long felt want in the chain of communication on the island.

COUNTRY NEWS

In news from country centres, the Wide Bay and Burnett branch held a very successful monthly meeting at the resort of Bargara on May 19. The members of the branch, under the chairmanship of Eric 4XR, and after the business, tx and blindfold forms were enjoyed while the XYLS and harmonics took advantage of the day by making a special trip. Our Radio Club held its normal monthly meeting on the second Monday of the month, on May 14, and after a reminder by the secretary, the Bundaberg area on meeting nights to make yourself known.

The Central Queensland branch advises that the field day at Fletcher's Creek on May 19 was a grand success, helped particularly by the hospitality of Don and Mrs. Gibb, together with Mark 4MB and the local radio club. The branch meets on the third Friday of the month at the High School in Bolsove Street.

From a news report, the radio clubs of Townsville and Burdekin soon intend visiting each other's meetings, which gives an idea others might like to follow.

From the report of the Rockhampton branch, it appears that the Central Queensland branch will soon be operating using its own call sign of 4WQ. The branch is planning to visit the 4WQ, those wanting to join in hook-ups should have no shortage of unwritten invitations.

Moves are under way in Queensland for the formation of a new committee for the Division, for which the Division takes responsibility for three years from July 1. All groups interested have been asked to contact the Divisional Secretary, and it's been pointed out that the job is not as binding and onerous as many members have supposed it to be. The suggestion is that the Divisional Secretary, country branch or club might like to nominate.

Speaking of country members, a number have raised a very legitimate issue. Remarks have been made in the past that many did not vote in recent Divisional elections. It is pointed out that the city members for whom they had to vote. Now the country members have realised this and are now voting. It is pointed out that the city members is over the air during the Sunday morning hook-up. However, in the hook-up, the city members are not present by their presence. Let's have many more of the city members joining in please.

Amateurs note with satisfaction that the V.L.F. Group in Brisbane has got itself a permanent meeting place for their monthly meetings. The venue is the Social Services Institute Hall in Berwick Street, Valley; the time, the second Friday of the month. It is an assurance that all interested will be welcomed.

PERSONAL

Sunday, June 10, 1962, was a day that L. Rickaby, 4VR, has been looking to for 22 or 23 years, so he was heard to say. For then, he was able to make his most satisfying broadcast with his son, now operating on 40 m with the call 4RX. For about five years, Brian has been heard under the call 4ZAP, but with the 2ACQ in the background. It wasn't until early in June he had his gear at his new home at Tenynson on the rail. On the 10th, he and his son were heard on a short phone QSO before trying out Brian's tx on c.w. (Father's verdict: Needs improvement; key clicks, sparks, etc.)

Travis 2ACQ has been in the north of Prosopine on his extended tour of the north and should still be rolling around operating portable very frequently. Stan 48S is not around much, but particularly on 40 m, on doctor's orders, and a possible tx break-down, and all miss his cheery voice. His pal, Alf 4OL, is a regular around the place and in the last month

some of his fish stories have been a bit much. He said he caught plenty one day and the sole or rock cod he's not sure which. He so large that only one could be cooked at a time in an electric fryer. 73, Don.

CAIRNS

Had a visit from Bob 4RW during the month. He turned up unexpectedly demanding his cake which he claims the CVL promised him. He said his dad was talking to me from home QTH and told us that he was coming up over the week-end and that he wanted a birthday cake made. Such is the problems associated with growing old (VK5 please note). Even though he was unexpected, he was invited to see him and treat about his trip to the old dart and places east. He didn't get his cake, gave him a cup of tea instead.

Everybody will be sorry to hear that Claude 4ZY has been leaving town. His XYL has been very ill and has not been allowed any visitors, but I did hear today that she was improving, so Claude we hope that the improvement will continue. Graham 8DJ has been very active, mostly on 7 and 21 MC. Chaps who knew Graham when he was in the navy, saw him and were very surprised he was now off the air. Mickey 4ZJM finally got his movie projector, thank goodness. Ever tried to view 8 mm, movies without a projector? I did. Once. He turned up in company with 4ZWG with a brand new projector and a case full of films. He got to bed at 10 o'clock and didn't get up till 10. Jack 4ZWL now has triplets, all jokers! The only catch is that they were born several years apart. Does that count Pansy? The boys are 10 and 12 years of age, and I do well so congratulations to you both. My spy from the Tablelands has either been beheaded or gone home. I don't know. Harry 4HK got on with that flask that 4UX was saving for him. For that matter have not heard much of 4UX which is strange, so they both may have been having a bit of a row.

SOUTH COAST ZONE

It is pleasing to report that Bill 4RJ is looking very well and was very chirpy during a recent visit to him. Undoubtedly his return to Amateur Radio has had a beneficial effect. In the month of May, when he was in the 2ACQ, returned to the home QTH after spending a week at Urrunga and another week on the journey. Had a very enjoyable evening with Fred 4PV and Wally 4XV, and a very good Byron Bay boys, John 2AT1 and Bob 2AFP. Unfortunately we could not manage to meet Jack 4ZWL and his wife, but they had the VK2 country members, endeavoured to call on Amateurs that his itinerary allowed.

To give Frank a preview of the scenery to be expected further north, made our way through the Numbah valley to the Natural Ark and thence on to Murwillumbah to Eddie 2BB. Moving on we called on Bill 4ZY, who was in the 2ACQ. Bill's show showed us Bill's shack which was an excellent show and equipped with Hallcrafters tx and rx. A hurried trip to Brisbane led to the finding of Stan 4SA. While watching "the rush and hurry" of the city, managed to spot Bill 4WX passing by. A CQ corralled him and an enjoyable evening was had.

Southport Radio Club appears to be making heavy weather in its progress. The lack of a permanent meeting place has probably the numerous counter attractions of the area being the cause. Here's hoping that in the near future the club will start in on to greater progress than before. 73, AWS.

TOWNSVILLE

Well as promised, last month I have finally made it to s.a.b. thanks to the help of local boys who rolled up and gave their assistance to try and match my 4 element tribander to the tx. It sign and the antenna. The feed line is 300 ohms and the output is between 50 and 70 ohms, and so far unable to effect 100% transfer of power. The fact that the April meeting of the local club lapsed for the want of a quorum, there was a better roll up at the May meeting. It was decided that the local boys pay a visit to the Burdekin District Club at their next meeting and Claude 4UX has promised a reciprocal visit the following night to their club. Maybe the clubs will benefit from the exchange of visits.

A visitor to the shack was JABEXY, fully equipped with camera to take some candid shots of the shack. He was from the north of Tokyo. Claude 4UX, Jess XYL and harmonic dropped in for a cuppa, but would not partake of the evening meal, hearing no doubt of my cooking.

On a visit to Cairns last week-end, managed to see Claude 4ZY, who informs that he was not too well and unable to receive visitors

at the hospital, so missed out on seeing her. On calling on 4ZW, was frightened by the sole or rock cod he's not sure which. He said he caught plenty one day and the sole or rock cod he's not sure which. He so large that only one could be cooked at a time in an electric fryer. 73, Don.

It seems that quite a number of southern boys have been passing through with their mobiles and have failed to visit the local shacks. No wonder, then, that they are noted for their hospitality and we in the north more so. Let us know when you arrive, there is always someone off work who will ensure you see all the places of interest, as quite a number of us are shift workers and thus you don't have to wait until the evening. We can organise a tour of your interest. The Collins Club of the local club or the writer of these notes know before you arrive and we will be happy to greet you. 73, 4RW.

SOUTH AUSTRALIA

The monthly general meeting of the VK5 Division held in Adelaide in a capacity house, in fact it was without doubt the largest house ever to grace the clubrooms. The meeting took the form of a discussion, with a presentation of equipment, and a discussion by Mr. White on its generation and transmission. Fortunately for me, and my pride, a deal of blackboard work came into the discussion, and the Council is still firmly sticking to its decision to forbid me posting the blackboard away with my notes. I cannot give any further notes on the discussion. A small pause whilst I breathe freely again!

An extra good film of the Collins Company's expansion in 1961 followed, and the enthusiastic reaction of the audience indicated just how much interest in the subject. The Council was ably proposed by Phil SNN and the applause which followed told its own story. A presentation of a book by Phil SNN, who brought down the house with his suggestion to Mr. White that in view of the tremendous amount of thought and work that has gone into the Collins Club, the Council should raise it to its present high standard, perhaps a little more thought and work might be required to make it a more complete and the price somewhat nearer to the empty state of the average Amateur's pocket! Hollow laughter from Mr. White!

A practical demonstration of the equipment then followed and the voice of Dud 2DQ came out of the speaker from space, suggesting with a touch of sarcasm that this demonstration was purely made to make it up and notice. An attempt was then made by Comps 3EF to lure the said "Pansy" into saying a few words. This was not to be. The bird, a very wild bird, did not fall for any such birdseed and disappeared hastily toward the back of the room. Pansy thinking I would fall for this, then got up and said a few words. Life would not be worth living. However, it goes to show to what lengths Comps will stoop to continue in the matter. The bird was on a.m. versus s.a.b. Quick-Quick to you!

Incidentally, most of those present went out of the way to let me know that the attendance at the meeting was not as high as even a buy and sell night, and dared me to print it. Poo! See if I care, I get them to a buy and sell every time, not just once a year.

Quick-Quick to you! This was suggested by George 5RX and after a smoko the business for the night began. Nothing of extreme importance was discussed, but a number of resolutions were passed and then the chairman, John 3JC, announced that the letter received from the Elizabeth Amateur Radio Club be read and discussed. This letter will be printed in the Divisional Journal and read by all members and therefore little can be served by continuing in the matter. I think that the general opinion of those present was that Council acted without sufficient warning among themselves on the matter. They may think the letter sent a lot more important than it really was, and the applying of a five minute time limit on the discussion of the letter was a bit of a nuisance. It gave the false impression that Council was attempting to "gag" the discussion. However, the letter was not as important as it was made out to be, and I feel that by then a much more



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of the W.A. Division, and as decided some time ago, one year's free subscription will be donated to the club for the rapid progress that we are making in the West. It is the Rev. Bro. McKenna and, of course, we extend a welcome not only to those who have been with us for some time but also to those other new members who are coming along now.

I believe the S.E.C. has been busy down Kataning, where the 6X7 has been proceeding rapidly and creating much jubilation and additional activity on the part of at least two of the X group. Band 6X7 has been up to those other new members who, with the disconnection of the d.c., is completely re-building his rig in readiness for the day the rig will arrive. As for the 6X8, from the low frequency a.c., Robbie 6X8 has been giving the high frequency a.c. a nudge along with a mighty fine cubical quack, which is not only heard but has stayed on the winter willy-willies which are frolicking around Kataning.

I have heard, too, that Herb 6X0 isn't satisfied with the S.E.C. anyway, and has built up a "spare" 150w. rig—just right for portable work at a barbecue or picnic. And don't think that Herb runs off batteries either; a trailer mounted 24v. diesel unit is the power source, which you very much, and I'll bet there are some other appliances as well. This sounds like a very good spot to start our W.I.C.E.N. organization being effective. Herb, Kataning, has made a very good regional centre. I understand that the main reason for the relaxation before winter starts is so that Clarrie can stay up late and run until for those 80 W. Frank.

Now what about some news from our other larger centres: Geraldton, Wyndham, Albany, Kalgoorlie, Norseman, Esperance, Perth, Fremantle, Broome, Derby, Bunbury, Haverhill, will write!

Even mention of Meekatharra reminds me that Peter 6X7C, Foren, ch. 10, has been with the time these notes are printed should be on his way, after training, to take up the post at the Flying Doctor Base, Dopey.

Had Peter 6X7C been in the West, I understand that the main reason for the relaxation before winter starts is so that Clarrie can stay up late and run until for those 80 W. Frank. Now what about some news from our other larger centres: Geraldton, Wyndham, Albany, Kalgoorlie, Norseman, Esperance, Perth, Fremantle, Broome, Derby, Bunbury, Haverhill, will write!

Some considerable discussion has taken place recently with regard to the Sunday morning news service from VK6WL. The recent set-up was that 6WL, operated by Wal 6AG, disbursed news and notes at 9.30 a.m. 6WL then went portable to Dave 6WT who had been treating us to various technical articles. Val was then to take over, and the members in various centres and closed some during the morning.

Now that the service, which is more for country members than for the city, is being run on a two-band broadcast, being done on 80 and 40 mc, and the possibility of being re-broadcast on a v.h.f. band, the time taken for reports has gradually become longer and longer and going beyond the time nominally allowed by the P.M.G. Dept.

However, Dave 6WT has agreed to take reports and queries on the broadcast after the session is over and as 6WT can go on for as long as he likes as he is after the session. Fine business, Dave, hope you can keep it up. Incidentally, the Division has acquired an ASB is very suitable for 40 mc transmissions to the country. The ASB has been expanded to have so far been very gratifying. You should see this box of r.f., as well as hear it. In fact the ASB has been expanded to 2 ft. wide, 3 ft. deep and 3 ft. high. Push buttons and meters, remote control, and cooling fans. All we want now is somewhere to operate it. With a light as dim every time the main relay goes "clunk".

Believe 15 and 20 mc quite active lately. I have been up to the V.S. and all V.S. Midday and early afternoon has been the best time. 20 has been a bit intermittent, but VEs are active and heard all day. I have heard a lot of good work Les, another W.I.C.E.N. possibility?

Don't forget the meeting night, third Tuesday in the month, to the Perth and Fremantle. Country boys especially welcome. 73, G.L.S.

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TASMANIA

We extend our deepest sympathy to Bob 70M upon the death of his aged and very much respected father, Captain Harry O'May, during the month of May. Captain O'May has left us all a rich heritage in the form of books published about ships and shipping in Tasmania. For those of us who have not had the privilege of reading them, I can only recommend them to you, they are fascinating.

In the field of Amateur Radio, the most interesting story this past month has undoubtedly the contact in between David 72AI on Mt. Wellington and Brian 72MB on Walkers Lookout on King Island. This contact is all the more remarkable as it was made on a communications gear used by Brian. Still talking v.h.f., the list of records supplied by the Federal Executive reg. v.h.f. affairs in respect of this Division, should undergo considerable expansion when claims are submitted for ratification. Both on 6 and 2 m, records will easily be toppled.

At our July general meeting, we will be pleased to find a number of very comfortable chairs in our clubroom. We have to thank Ted 72J for "unearthing" these chairs at very reasonable cost. Council has devoted a lot of time just recently to putting together copies of our Divisional Constitution. All members can now obtain copies upon request.

Remember that the R.D. Contest is not far away, and all members should be prepared to submit a log. Our Division was third last year, with your help the trophy can return to us this year. The functions of the Federal Contest Committee have been passed on to the VK4 Division. We thank those southern zone members who have given such unstinting help to the committee and also the members of that committee for the job so willingly and well done during the past three years. We also thank the committee and also the members of that committee for the job so willingly and well done during the past three years. We also thank the committee and also the members of that committee for the job so willingly and well done during the past three years.

Charlie 7KS is re-building his aerial coupler to give him better output, particularly on 7 Mc. Ted 72J is also working on his aerial, from scratch, following the discovery that the 6146 in his final was only 50 per cent. efficient. The future of the 7 Mc. band is being discussed by Tom 7FM and we were privileged indeed to be addressed by Tom on the subject of "Video" Tape Recording. The subject matter was most lucidly presented and the important points were well made. Thank you Tom for a really interesting and informative address. 73, ZZZZ.

NORTH ZONE

The May meeting of this Zone was again above average, and was a most successful meeting was held. After the business of the evening was concluded, TJP showed some very interesting slides of the Hydro Electric Potina project.

A very pleasing angle on our meetings is the increasing number of associate members attending. These younger members are taking a keen interest in Amateur Radio and several of them are constructing equipment and receivers. The 144 Mc. band is now being watched regularly by some of these lad.

Visiting the Zone this month was Bryan 72BE, who left his car at 7BQ's whilst he visited on the subject of the P.M.G. Department. Bryan took 144 Mc. gear with him and with an output of 25w. has worked on 144 Mc. from the Potina (approx. 130 miles) and also to Mt. Wellington. Incidentally, what's left of his car is still at 7BQ's—any offers?

Bob 70M is also in the Zone at present and has found time to visit 7BQ and 7LZ. Naturally the talk got around to Ham Radio and the 144 Mc. band has been on the air about 40 years so he can certainly be classed as an "Old Timer" and an authority on the subject.

It is with deep regret that we must here record the death suddenly of Perc. Crawford, Perc., although not a licensed Amateur, took a keen interest in this Zone and over a period of at least thirty years he consistently gave help and advice to our members. He was a member of the Zone and was not a member in this Zone who has not benefited by Perc's unstinting help or guidance at some time or other. To his wife goes the heartfelt sympathy of all our members.

NORTH-WEST ZONE

It is regrettable that I have to report little activity in this zone. The quietness of the zone in this Zone is amazing. And to add insult to injury, attendance is falling off at our Zone meetings. At the last meeting only nine members attended. Why? Stir yourselves, chaps, and if you think the organisation worthwhile, come along. I hate to repeat myself, but I've, has certainly made inroads into our hobby.

TMS is busy soldering his rig into an airtight tin box, when he is not busy viewing. Went along to check out some technical problems with 7XL the other night and finished up viewing a variety show. The pattern is much the same everywhere. 7MZ has opened up again from Wynyard and apart from a few initial gurgles is putting out an f.b. signal. 7KH is heard consistently and I can't find any other sign to report apart from 7XL on a.s.b. Actually apart from the Potina boys, nothing much is heard of VK7 on the hearable frequencies. Complaints to Hacking on getting his rig. No doubt this will spark off some v.h.f. activity and Harry and Bob can now work on a Burnie-Derpout v.h.f. link. Lamentations on the band cuts, and I suggest that we fill the remnants to the full. Now that the axe has descended once, watch out. Let us not be caught unawares. Use them, or lose them! It is up to you. I will report more news when someone creates some. 73, TMS.

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Model TR-6S

Sensitivity: d.c. 20,000 ohms/volt, a.c. 10,000 ohms/volt. Ranges—d.c. volts: 6, 30, 120, 600, 1,200v.; a.c. volts: 6, 30, 120, 600, 1,200v. D.c. current: 60 μ A., 6 mA., 60 mA., 600 mA. Resistance: 10K, 100K, 1M, 10M ohms. Capacitance: 0.001-0.2 μ F., 0.0001-0.01 μ F. Inductance: 30,000H. Decibels: -20 to +17 db. (0 db.—0.775v.—600 ohms). Dimensions: 4 1/4" x 6 1/4" x 2 1/4". Weight: 1.3 lbs.
Price £9/10/0 inc. tax.

FERROCARB VACUUM TUBE VOLTMETER

V.T.V.M. £19/17/6 inc. tax
H.V. Probe £3/5/0 inc. tax
R.F. Probe £2/10/0 inc. tax

ECKO NO. 88 TRANSCEIVER

Portable, xtal locked 4 channel, 40 to 43 Mc., 14 valves, 1L4, 1T4, 3A4, etc., 12v. 3a. input power supply. Less crystals, mike and headphones, etc.
To Clear, £8/10/0 each

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TMK "Syncretape" 7" Rolls, PL-12 (Standard) £1/16/6
TMK "Syncretape" 7" Rolls AC-18 (Long Play) £2/10/6

V.H.F. RECEIVERS

Type R89/ARN-5A. 300 Mc. Valves: seven 6AJ5s, two 12SN7s, one 12SR7, one 28D7, six relays, and three crystals of 6522.9 Kc. As new. £5 each.

1155 GENEMOTORS TYPE 34A

Input 9.3v., output 225v. at 110 mA. Complete with relays and filters, in case. Weight 30 lbs. 19/6 each. 5/- handling charge.

COMMAND TRANSMITTERS

3-4 Mc. range £7
7-9 Mc. " £6

SPECIALS!!

Dial Light Globes, Madaza, 9/- box 10
40 mA. Dial Globes 1/- each
Carbon Throat Mikes, (Y10A/55550) 7/6
Magnetic Relay Switch, 20a., 24v., 10/-
Egg Insulators, 1 1/2" x 1" 9d. each
300 ohm T.V. Ribbon 1/- yard
Three-Core Domestic Cable 2/3 yard
Hook-up Wire, 10/010, red, black, and green 4d. yard, 30/- 100 yd. roll
Earphone Inserts, actuating diaphragm type, ideal as small speaker 7/6
Pye double bulkhead mounting Chassis Co-ax Connectors 2/6
Pye Co-ax Connectors 4/- pair
English Co-ax Connectors, plug and socket, suit 1/2" cable, 4/- pair. Right angles 4/- each.

Crystal Sockets, DC11 2/6
Crystal Sockets, FT243 & miniature 2/9
Jack Boxes, SCR522 type, contains 10K pot and knob. Size 3 1/2 x 1 1/2 x 2, 3/6
AR8 Cables, 10 ft. long, 8-pin plugs attached 10/-
High Impedance Headphones, 12/6 pr.
SCR522 28v. Genemotor power supply, 20/-, 5/- packing fee.
English Filter Chokes, 40 mA., 100 ohm resistance 3/6 each
Carbon Microphones 12/6 each
Vibrators, Oak/M.S.P. 6v. synchronous 7-pin AV5211R £1 each
Octal Plug and Socket, American Ampenol, in metal screw case, 8/6 set
"Scope" Soldering Iron, to clear, 45/-; complete with transformer, £4/10/0.

MULTIMETER MODEL 200H

20,000 ohms per v. d.c. 10,000 ohms per v. a.c.



Specifications:
D.c. volts: 0-5, 25, 50, 250, 500, 2,500.
A.c. volts: 0-10, 50, 100, 500, 1,000.
D.c. current: 0-50 μ A.; 25, 250 mA.
Resistance: 0-60K ohms; 0-6 meg.
Capacity: 0.01-0.3 μ F. (at a.c. 5v.); 0.001-0.01 μ F. (at a.c. 250v.).
Decibel: minus 20 db. plus 22 db.
Output range 0-10, 50, 100, 500, and 1,000.
Battery used: UM3 1.5v. 1 piece.
Dimensions: 3 1/4 x 4 1/2 x 1-1/8 in.

Complete with internal battery, testing leads and prods.

Price £5/17/6 inc. tax.

Spare Probes for 200H 2/- pair
Spare Probes for FT34 4/6 pair

HAM RADIO SUPPLIES

5A MELVILLE STREET, HAWTHORN, VICTORIA

Phone 86-6465

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The valves in the Super Radiotron range offer unparalleled uniformity of characteristics coupled with top performance and dependability and the **12AU7A** general purpose medium-mu twin triode, being the end result of a programme of continuous improvement, is no exception. For example:

A strengthened mount structure reduces microphonic effects; pure tungsten heater wire ensures long life; low interface cathode gives long and trouble free service in critical applications.

These important features plus its compact size combine to produce a valve worthy of its place in the Super Radiotron range, for use in your TV, radio, HI-FI and industrial designs.

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